
Part 650 Engineering Field Handbook

Chapter 7

Grassed Waterways



Issued December 2007

Cover: Grassed waterway in Fayette County, Iowa

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Chapter 7

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650.0700 Introduction

Grassed waterways are natural or constructed channels shaped to required dimensions and lined with suitable vegetation for stable conveyance of runoff.

Grass-lined water conveyance channels are widely used to convey excess runoff water where flows are of a sufficiently short duration to allow the grass to withstand the inundation period and operation is sufficiently infrequent to allow healthy grass cover to be maintained. This type of channel may be used for diversions, spillways, and floodways, as well as for waterways to convey local runoff.

Research conducted during the 1930s and 1940s documented the benefit of grass as a water conveyance channel liner and provided the basis for engineering design of a stable section based on permissible velocity. This approach was documented in Soil Conservation Service (SCS) Technical Paper (TP)–61 published in 1947, revised in 1954 (SCS 1954), and was used for the design of grassed waterways throughout the remainder of the 20th century. Since the development of the permissible velocity approach and procedure, additional research has led to a more in-depth understanding of the interaction of the flow with the vegetated boundary of a grass-lined channel and the digital computer has allowed more extensive calculations to be easily carried out when needed. These advances led to the documentation of an effective stress approach to grass-lined channel design documented in USDA Agriculture Handbook #667 (Temple et al. 1987). This approach, which also incorporates more general stable channel design concepts and data, has been successfully integrated into the Waterway Design Tool (WDT) software used by the Natural Resources Conservation Service (NRCS) for design of vegetated earth spillways and is being used for design of other grass-lined channels. Incorporation of the allowable effective stress approach into the NRCS Engineering Field Handbook (EFH) allows additional design flexibility through separation of the effects of soil and vegetal parameters and makes the procedures used for waterway and diversion design consistent with those used for other grass-lined and unlined channels.

650.0701 Assessment of suitability

(a) General considerations

A constructed waterway is designed to carry the estimated flow without damage to the waterway or its lining. Waterways should be planned and designed to fit the conditions of a particular site, and the following factors dealing with construction and management should be determined before designing the waterway:

- slope of the proposed waterway (note that this may need to be modified to get a satisfactory design)
- vegetation suitable for site conditions
- expected height at which vegetative cover will be maintained, both in growing and dormant seasons
- allowance for area of field occupied by the waterway
- allowance for freeboard, if required by local standards and specifications

Design of a satisfactory vegetated waterway requires assessment of several site-specific factors: soil properties, management requirements of the vegetation, and climate. The soil properties define the allowable effective stress and are also a factor in the site hydrology and determination of the design discharge. Proper management of the vegetation is critical to its ability to provide the expected level of protection for the channel. The level of management at the site that is feasible, economical, and logistical should be determined and vegetation that will thrive under that degree of management selected. Since height of vegetation is an important factor in flow resistance, realistic estimates of the frequency of mowing and maximum height to be achieved between mowings should be made. In addition to its impact on site hydrology and design discharge, climate is an important factor in vegetation selection and the intensity of management required. In selecting the vegetation and maintenance program for a site, the goal should be to maximize the quality and uniformity of the resulting cover.

A successful grassed waterway also depends on good conservation treatment of the contributing watershed and a regular maintenance program. The better the erosion control in the watershed, the less silting there will be in the waterway. Good conservation practices also reduce the peak rate of runoff and volume of water to be carried by the waterway. When good conservation treatment of the drainage area is not obtained, greater maintenance is usually required.

Waterways subject to constant or prolonged flows require special supplemental treatment, such as stone centers or subsurface drains capable of carrying a portion of such flows. Typically, a grass lining is not suitable if continuous flows for more than 72 hours are expected. A grassed waterway is susceptible to considerable erosion damage until permanent vegetative cover is established. Flows experienced by the waterway during the establishment period may result in maintenance or repair being required.

If an existing natural waterway is to be used, it may need to be selectively cleared, shaped, or enlarged to accommodate the design flow. It also must be checked to ensure stability. Natural waterways that are providing important woody wildlife cover and are not seriously eroding should not normally be disturbed.

Avoid placing waterways where there are sharp, unnatural changes in flow direction. Land management systems should be planned to conform to natural land features. The location of the alignment should not pose a threat to important landscape elements such as unique trees, geologic formations, or scenic features. The slope of the waterway should not interfere with adjacent land uses. Shallower and broader designs usually blend in better and are less disruptive.

(b) Legal/regulatory considerations

If buried utilities cross the proposed alignment, contact the utility companies to determine the exact location of underground services, and analyze compatibility.

The use of public road ditches for the disposal of water should be in conformance with the policy of the local transportation authority and the NRCS. Where a road crosses a waterway, consideration should be

given to providing a culvert, bridge, or lining to protect the waterway from resulting damage.

Any other applicable state laws and local ordinances and regulations must be observed in locating waterways and outlets.

650.0702 Planning and preliminary design considerations

(a) Location

If possible, consider more than one location, and select the most practical and economical alternative, considering aesthetics and the nature of local land use. Consider outlet conditions, topography, vegetation, land values, cultural activities, visual quality, soil type, length of slope, and natural features. Waterways should be located such that they will not experience vehicle traffic or other activity sufficient to damage the vegetal cover.

The location of waterways is important to a good program of erosion and sediment control. Wherever possible, the natural drainage system should be preserved and used. Waterways should generally be located in natural drainageways where water can drain in from all sides. Moisture conditions and soil fertility are usually best in such areas for establishment of vegetation. Other advantages of natural waterways include:

- flattest grade in the immediate area
- most stable waterway conditions
- adequate capacity
- sufficient depth for outletting diversions, terraces, and rows with minimum earthwork

Waterways can also be located along development boundaries, road rights-of-way, property lines, or along storm sewer center lines. Special precautions should be taken when waterways start or end near property lines. Care must be taken to prevent sediment from damaging lower or downstream properties. If the upper or upstream end is near a property line, the transition must be stable to prevent erosion or degradation of neighboring land.

In lieu of a constructed or natural channel, an adjoining pasture or meadow strip may be used. The surface of such areas should be checked, however, to ensure that uniform surface and adequate width are available to spread the flow and that the type and density of vegetation are adequate to protect the soil from erosion.

An area of land parallel to a field boundary should be used for the waterway, if suitable. One advantage of this location is that the waterway is less likely to be damaged by farm equipment. Such a location often requires the construction of a channel to:

- provide an outlet for terraces or diversions that cannot be extended to a natural draw
- provide an outlet away from buildings or other critical areas
- avoid the use of a gullied natural draw that would be impractical to stabilize, especially those with large watersheds

(b) Slope

The design bed slope will generally reflect the slope along the chosen channel alignment. If the slope at the site changes significantly and the bed slope will need to change, the channel can be broken up into reaches for analysis. While it is generally most convenient to follow the lay of the land in selecting a slope, there are occasions where modifications to the slope may be necessary such as:

- If it is not possible to find an appropriately sized stable section, it may be necessary to build the channel on a flatter bed slope.
- If it is not possible to obtain adequate capacity under a depth and/or width limitation, then a steeper bed slope is needed.

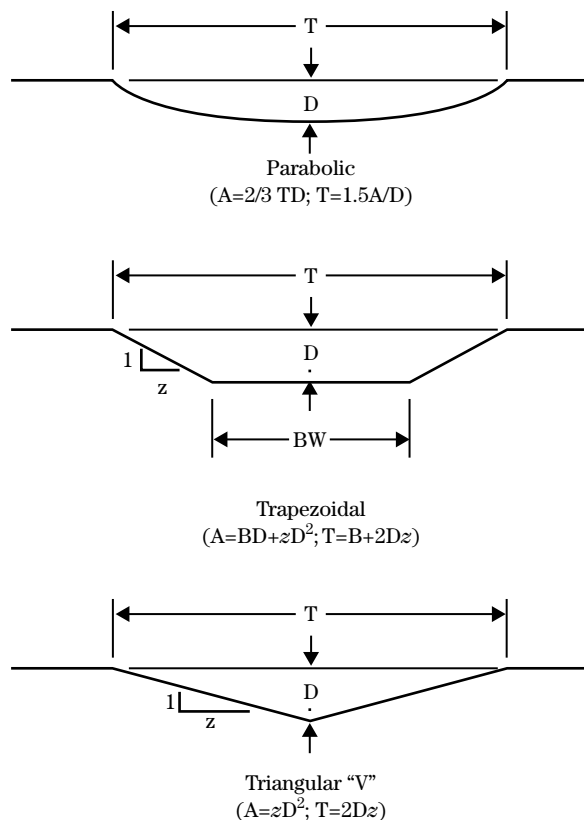
Final grades should be selected to meet capacity and stability requirements. When permanently vegetated waterways are used in residential or commercial developments to manage or convey storm water, the grade of the channel should be such as to minimize standing water or wetness problems. The slope should be steep enough to minimize sediment deposition in the waterway and flat enough to minimize erosion during large flow events.

(c) Cross section shape

The channel section is chosen to accommodate site conditions, limitations imposed by availability of excavating equipment, and allow for maintenance, grazing, or traffic.

Vegetated waterways may be built in a parabolic, trapezoidal, or V shape. Parabolic waterways are the most common and generally are the most satisfactory. This shape is ordinarily found in nature. Small flows are less likely to meander. Waterways constructed with a trapezoidal section often tend to revert to a parabolic cross section. A modified trapezoidal cross section with the bottom center constructed 0.3 to 0.5 feet lower than the edges is sometimes used on wide waterways. The cross section should be designed to permit easy crossing by equipment where necessary. Typical waterway cross sections are shown in figure 7-1.

Figure 7-1 Typical waterway cross sections



Where: A=cross section
 D=design depth
 T=design top width
 B=design bottom width
 z=side slope ratio

(d) Vegetation

Consider the possible future conditions of the vegetative lining based upon natural succession and maintenance. In some cases, the expected stand of vegetation may not be attained or will deteriorate under normal maintenance. Therefore, it is necessary to check the waterway design for stability under any eventual conditions of deterioration that may be anticipated. Select vegetation that will provide long-term uniform cover with the anticipated level of maintenance.

(e) Outlets

All waterways shall have stable outlets with adequate capacity for the design flow. The outlet may be another grassed waterway, earth ditch, structure, or other suitable outlet. In all cases, the outlet must discharge in a manner that prevents erosion. Outlets should be constructed and stabilized before the waterway is used.

(f) Sediment control

Permanent waterway channels should be protected from sediment. If sediment is not controlled before it reaches the waterway, several methods may be used:

- install a vegetated filter strip on each side of the waterway where surface water enters
- increase the channel depth to store trapped sediment and/or design areas of increased width or decreased slope to trap and store sediment
- provide for cleaning out the channel when its design capacity deteriorates

(g) Data collection

(1) Engineering surveys

A preliminary site investigation is recommended to determine the feasibility of using a natural watercourse or constructing a waterway. Such a survey includes a study of resource information such as soil maps, aerial photography, and contour maps; visual examination of potential alignment; topographic surveys; and estimating required capacity. A preliminary investigation should provide enough information to select a final alignment.

Surveys for waterways normally consist of field notes for waterway design, layout, and construction as shown by the example in Technical Release (TR)–62 (USDA 1979). These notes are satisfactory when drainage areas are small, topography is relatively uniform, and elevations with respect to other structures are not significant. Standard forms or data sheets approved for field offices may be used to record field notes. A profile and cross section of the original ground surface should be exhibited in enough detail to permit dividing the waterway into reaches of approximately uniform slope and shape.

Design information should include documentation of outlet conditions, topography, vegetation, land use and cultural patterns, soil type, length of slope, and other built or natural features. Typical design conditions will require general identification of the relative erodibility of the soil. Projects with larger drainage areas and more extensive design requirements may require more detailed information such as the unified classification of the soils that will be encountered along the alignment of the waterway, along with the plasticity index (I_w) and void ratio (e), or, for noncohesive soils, the representative particle diameter, d_{75} .

(2) Hydrologic investigations

Information on the watershed area, design storm frequency and duration, and runoff estimates are important in correctly sizing the waterway. The drainage area divides can be determined by field inspection or from topographic mapping. Drainage areas determined from mapping should be field-checked.

Determine the watershed area at the outlet of the waterway and at other points where it may be desirable to change the grade or cross section. Calculate the runoff in cubic feet per second at each design point for the frequency and duration of storm selected. Refer to EFH 650.02 (SCS 1989) or reference methods in National Engineering Handbook (NEH), Part 630 for the procedure.

650.0703 Design process

(a) Steps in the design of a waterway

Step 1 Plan the optimum location of the waterway centerline.

Step 2 Select design points along the waterway where grades, drainage areas, and/or type of lining change significantly.

Step 3 Determine the watershed area for the points in step 2 and for the outlet.

Step 4 Compute the peak runoff produced by the design storm.

Step 5 Determine the slope of each reach of the channel from the topographic map, profiles, or cross sections.

Step 6 Select the appropriate channel cross section and the type of channel lining(s) to be used.

Step 7 Design the channel for stability, typically based on the sparsest and shortest vegetation expected.

Step 8 Adjust the depth to obtain adequate capacity based on the densest and longest vegetation expected.

Step 9 Add appurtenant structures as needed to allow for prolonged flows.

(b) Initial design parameters: slope, discharge, section, and lining

If there are significant changes in slope or discharge along the waterway, it may be necessary to design the waterway in reaches. A reach (or segment) is generally a portion of the waterway having a near-uniform slope, discharge, soil type, and vegetal cover. A point of significant break in slope is a point of division between two reaches. The point of entrance of a diversion or other tributary where the discharge is significantly increased may also be a point of division between two reaches. Large changes in soil properties may also require cross section modification. Where there is a significant difference in cross section or slope between adjoining reaches, it may be necessary to install a transition section between them.

When the limits of two or more reaches have been determined, each reach is designed separately by procedures given in subsequent paragraphs.

Waterways are constructed to discharge the peak flow expected from at least a 10-year frequency, 24-hour duration storm. Out-of-bank flow may be permitted on land slopes parallel to the channel where the slope is not greater than one percent and where it is evident that no erosion or property damage will result. In every case, it is necessary to provide adequate capacity and limit velocities so there will be no danger to humans or animals, in accordance with site conditions.

The shape selected should be compatible with surrounding landform and landscape characteristics. Side slopes may be varied to better balance cut and fill and to improve aesthetics.

On sites where it is impossible to establish suitable permanent vegetation or it is desired to determine the stability of the channel in an as-constructed condition, the design can be based on bare ground conditions. Site conditions may warrant designing the waterway with a rigid or paved lining.

Perforated concrete blocks are a common form of structural lining in residential, commercial, or recreation areas where aesthetics, safety, maintenance, and rodent populations are primary design factors. First introduced as cellular concrete blocks by SCS in the 1950s, the improved versions are now referred to generally as grid pavers. Designed to carry heavy loads and allow turf to grow within the cells, their use is becoming more widespread as an alternative to conventional pavement surfaces or rock riprap (fig. 7-2).

The dimensions computed for waterway discharge capacity are the minimal measurements required to carry the actual flow and do not include a factor for extra depth required for space occupied by sedimentation or freeboard. Where local standards require such factors, they should be added to the computed dimensions. It is important that the depth be adequate to permit unimpeded discharge from terraces, diversions, and crop rows.

If the waterway must be crossed by farm equipment and other forms of traffic, consideration should be given to the need for increased width (fig. 7-3). Large combines, pickers, sprayers, and similar equipment

may require a significant increase in width over that needed for hydraulic capacity and freeboard. This scenario deserves consideration so that the proper modifications are made in waterway width and side slopes to meet the needs of equipment common to the locality. Vegetated crossing areas that are not otherwise reinforced may require additional maintenance and/or repair following flow events. Where paved channels are to be crossed, the lining must be designed to carry the expected loads. Culverts or bridges with adequate capacity may also be used.

(c) Conditions for stability

The purpose of the grass lining is to prevent damage to the channel by protecting the soil from eroding. To accomplish this requires limiting the stress on the soil and vegetation such that soil particles will not be detached and the vegetation will not be damaged. For most soils that will be encountered in practice, soil particles will be detached before damage to the vegetation occurs. In this case the effective stress on the soil controls channel stability. With highly erosion-resistant soils, however, the vegetation can become damaged before soil detachment occurs. The consequences of either mode of failure are similar.

Once vegetation becomes weak or damaged in a local area, there is a strong potential for rapid unraveling of the channel lining. This fact, along with high variability within the vegetative cover, makes it advisable for design criteria to be conservative. A very dense and uniform cover may be able to withstand larger stresses than those recommended here for stability design. Increasing the allowable stress is not recommended, however, unless the designer can be certain that the quality of the vegetative cover will *always* be maintained. In addition, the design should be adjusted to account for instances where highly variable cover conditions or low levels of maintenance are expected.

Design based on the erosionally effective stress considers the drag forces that can move individual soil particles, along with the influence of the vegetation on the distribution of stress. The approach is based on separating the stresses on the channel into components. Erosionally effective stress (τ_e) hereafter referred to as effective stress, is computed as:

$$\tau_e = \gamma DS(1 - C_F) \left(\frac{n_s}{n} \right)^2 \quad (\text{eq. 7-1})$$

where:

- γ = unit weight of water, 62.4 lb/ft³
- D = maximum flow depth in the cross section
- C_F = a vegetal cover factor
- n_s = roughness associated with soil grain size
- n = Manning's roughness coefficient
- S = channel bed slope, ft/ft

The vegetal cover factor was developed based on experimental data and accounts for the cover density and uniformity (Temple 1980). It takes on values between 0 and 1, with 0 indicating no vegetal protection and 1 indicating the channel is completely protected from stress. The vegetal cover factor is a function of vegetation type and condition.

Figure 7-2 Cross section showing perforated grid pavers

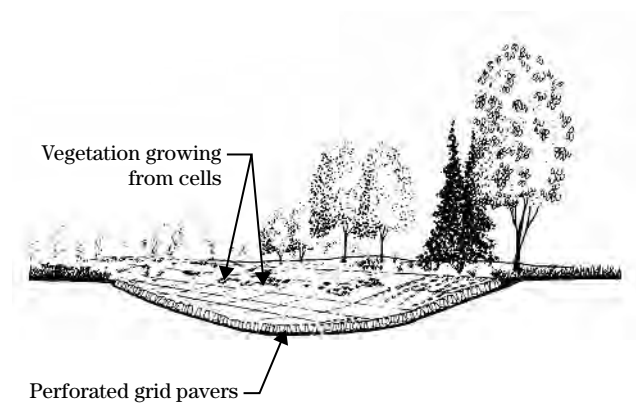
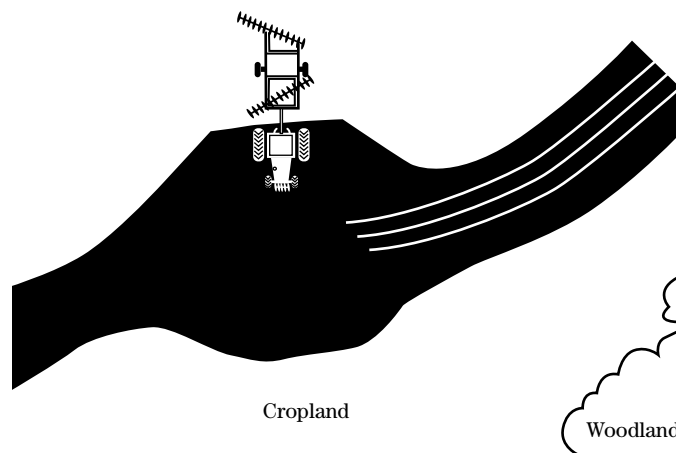


Figure 7-3 Provision for vehicle crossing



Flow depth rather than hydraulic radius is used in this calculation because it is the maximum stress in the cross section that governs the stability. The interaction of the vegetation and flow distorts the stress distribution in the cross section, and the vegetative lining tends to unravel rapidly once damage occurs.

Grain size roughness (n_s) for noncohesive soils is determined as:

$$n_s = \frac{d_{75}^{\frac{1}{6}}}{39} \quad (\text{eq. 7-2})$$

where the value of d_{75} is in inches. For fine-grained, cohesive soils, the value of n_s is taken as 0.0156. Figure 7-4 can be used to determine n_s based on d_{75} .

Steps in waterway design are as follows:

Step 1 Determine allowable effective stress based on an evaluation of the soil material.

Step 2 Determine the flow retardance and the allowable stress on the vegetation based on the sparsest and shortest vegetation expected (typically winter vegetation) and the flow retardance offered by the densest and longest vegetation (typically summer vegetation).

Step 3 Determine the vegetal cover factor associated with sparsest vegetation expected.

Step 4 Determine the bed slope.

Step 5 Choose a cross section shape.

Step 6 Use design aids or equations to size channel for sparsest and shortest vegetation.

Step 7 Use design aids or equations to determine depth required to contain the flow for densest and longest vegetation.

Step 8 Add freeboard as appropriate.

(1) Determination of allowable effective stress

The erodibility of the soil may be estimated to fall into one of these categories:

- easily eroded (sand textural soil classification)
- erodible (silt textural soil classification)
- erosion resistant (clay textural soil classification)

- very erosion resistant (based on local information or experience) (gravel textural soil classification)

Allowable effective stress is implied from this classification as indicated in table 7-1. Soil allowable effective stress may also be determined directly from soil properties. The allowable effective stress is the maximum hydraulic stress that may be applied directly to the soil without the occurrence of unacceptable erosion.

Figure 7-4 Calculation for grain roughness for noncohesive soils

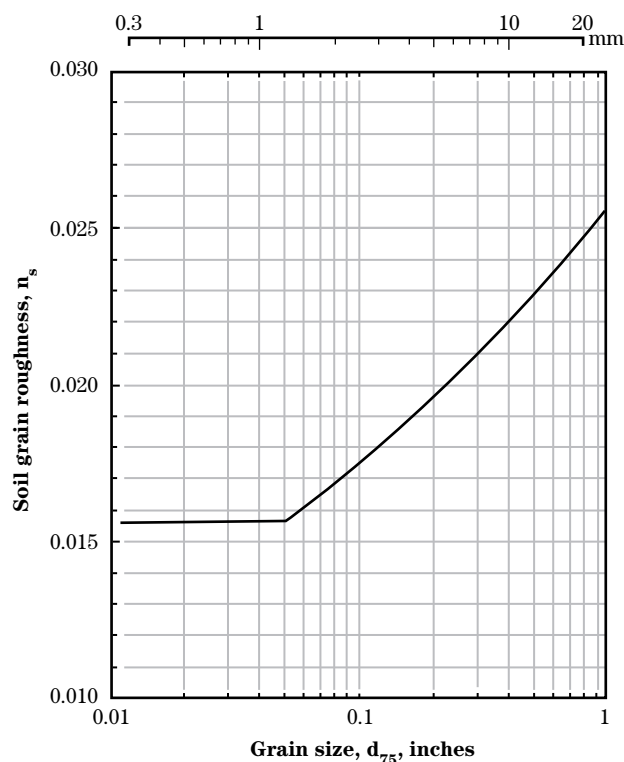


Table 7-1 Allowable effective stress for categories of soil erodibility

Category	Allowable stress, τ_a , lb/ft ²
Easily eroded	0.02
Erodible	0.03
Erosion resistant	0.05
Very erosion resistant	0.07

The first step in defining allowable stress from soil properties is to determine the unified soil classification of the soil from which the channel is to be constructed. This information may be available from the county soil survey (NCSS Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov>). Soils classified as GW, GP, SW, and SP are considered noncohesive soils. The remainder of the soils—GM, SC, GC, SM, CH, CL, MH, ML, OH, and OL—are considered cohesive soils.

For noncohesive soils, the grain size d_{75} in inches is needed to determine the allowable effective stress, τ_a . The grain size may be estimated from data, found in the soil survey. Once the d_{75} is found, the allowable effective stress can be determined from figure 7-5 or from the equations in appendix B.

For cohesive soils, the plasticity and void ratio are needed. The plasticity index describes the range of water content over which a soil is in a plastic state, described as soft butter to stiff putty; deforms but will not crack (Sowers 1979). More specifically, it is the difference between the liquid limit and the plastic limit, where the liquid limit is the maximum water content at which the soil will hold a specific shape when vibrated and the plastic limit is the minimum water content at which the soil will not break and crumble. In general, an estimate of the plasticity index can be obtained from the county soil survey. Laboratory procedures for determination of liquid limit, plastic limit, and plasticity index are in ASTM D-4318-00 (ASTM 2000).

The void ratio is the ratio of the volume of voids (water and air) to the volume of solid particles. It is expressed as a decimal and may exceed 1. Void ratios may be estimated based on soil type as shown in table 7-2 (Das 1994) or by using standard laboratory procedures.

Determination of allowable stress for a cohesive soil is a two-step process. The first step is to use the plasticity index to determine the basic allowable stress, τ_{ab} . This can be estimated from figure 7-6 or by using the equations in appendix A.

A correction is then applied based on the void ratio. The correction, C_e , is determined from figure 7-7 or from the equations in appendix A. For the organic soils OH and OL, C_e is equal to 1.0. If the void ratio is not known, then the maximum value of C_e from figure 7-7 for the soil type can be used. This will result in a con-

servative design. The final allowable effective stress (τ_a) is then computed as

$$\tau_a = \tau_{ab} C_e^2 \quad (\text{eq. 7-3})$$

Figure 7-5 Allowable stress for noncohesive soils

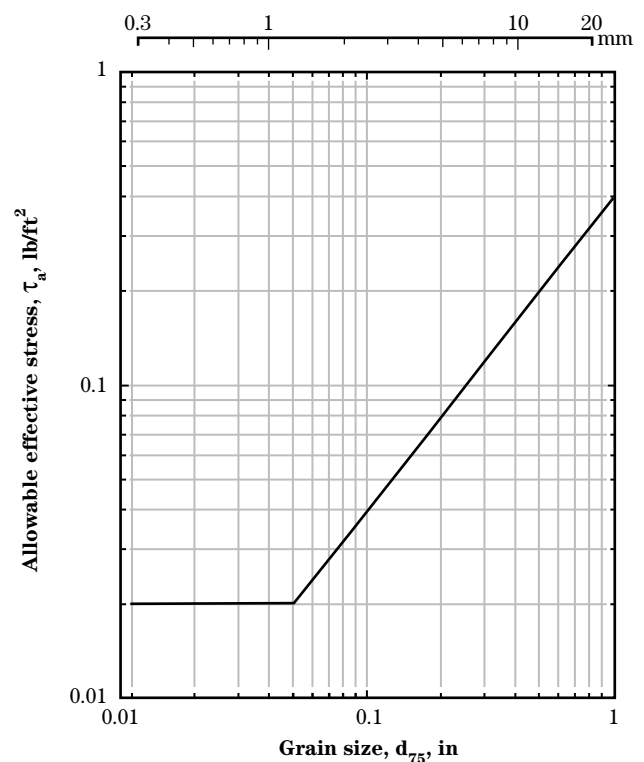
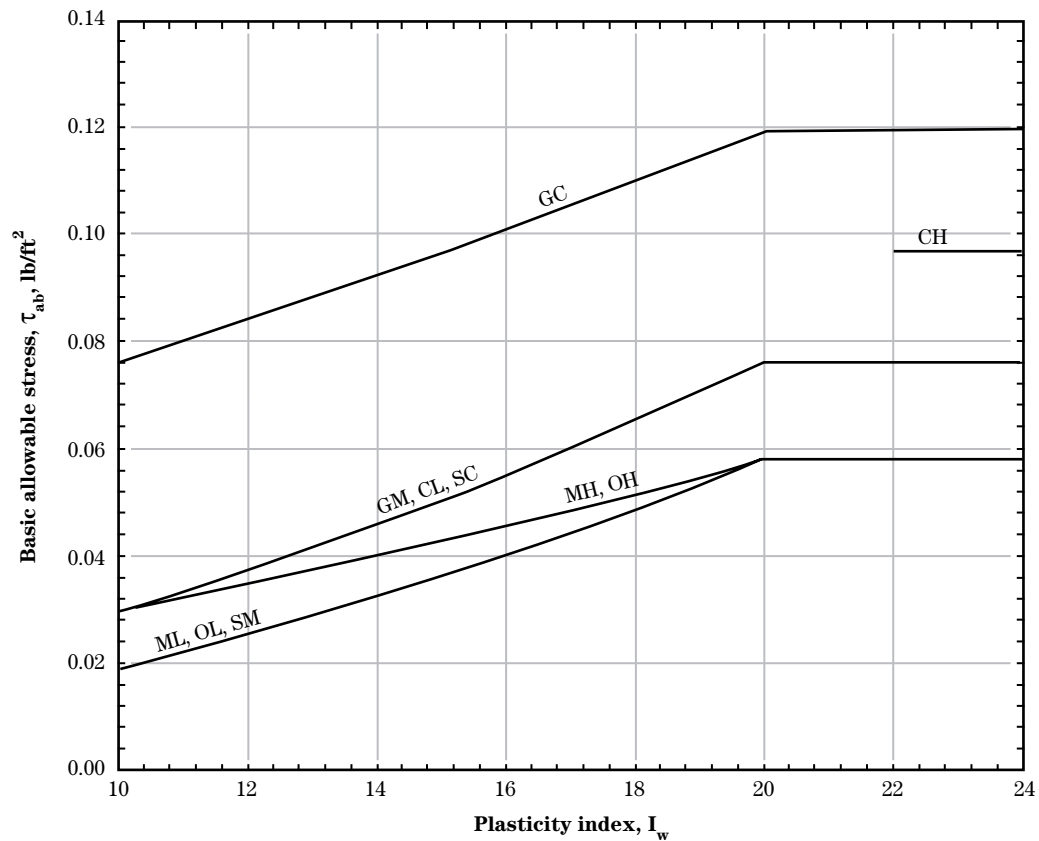
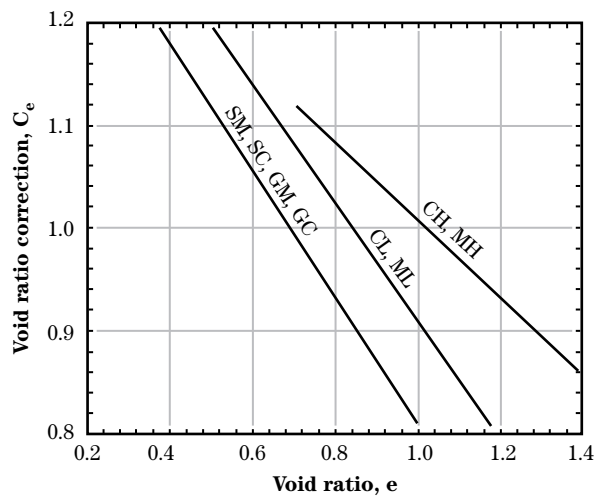


Table 7-2 Void ratios for selected soils

Soil Type	Void ratio, e
Loose angular-grained silty sand	0.65
Dense angular-grained silty sand	0.4
Stiff clay	0.6
Soft clay	0.9–1.4
Loess	0.9
Soft organic clay	2.5–3.2
Glacial till	0.3

Figure 7-6 Basic allowable stress for cohesive soils**Figure 7-7** Correction for void ratio

(2) Determination of allowable vegetal stress

The allowable vegetal stress is the maximum total shear stress that may be withstood by the vegetal cover without unacceptable damage. It is directly related to the drag experienced by the stems and therefore to the level of flow retardance offered by the vegetal cover. The allowable vegetal stress (τ_{va}) is related to the retardance curve index as:

$$\tau_{va} = 0.75C_1 \quad (\text{eq. 7-4})$$

Retardance curve index (C_1) is in turn related to the stem length and density of the cover as:

$$C_1 = 2.5 \left(h \sqrt{M} \right)^{\frac{1}{3}} \quad (\text{eq. 7-5})$$

where:

h = the representative height of the vegetation in feet

M = the stem density in stems per square foot

Table 7-3 lists stem density for several grasses. Since the density and height of vegetation is likely to be seasonal, upper and lower boundary values of C_1 are typically established. The lower boundary value is used in determining if stability requirements are met (steps 5 and 6), and the upper boundary value is used to determine the additional capacity needed for summer vegetation, which generally provides more resistance to flow (step 7).

The value of C_1 can also be determined using the retardance classes. The retardance class for various example ground covers is given in table 7-4, and the relation of retardance curve index to retardance class is shown in table 7-5.

(3) Determination of vegetal cover factor

The vegetal cover factor describes the ability of the vegetal cover to reduce the maximum hydraulic stress on the soil. It is related to the type and quality of the vegetal cover. Table 7-3 lists typical values of the vegetal cover factor. The value of the cover factor may be estimated by comparison of the sparsest expected cover with the covers described in the table.

(4) Determination of effective and vegetal stress

Design of a stable waterway requires that the hydraulic stress applied to the soil and vegetation by the flowing water be less than or equal to the computed

allowable values. The design tables provided in this chapter were developed to provide a minimum cross sectional area satisfying this requirement. Otherwise, effective stress must be computed using equation 7-1 and compared with the allowable stress.

Calculation of effective stress will require the additional parameter of soil grain roughness and calculation of flow resistance in the form of Manning's n and of flow depth. For fine grained materials, including cohesive soils, the soil grain roughness n_s is equal to 0.0156. For coarse grained soils, n_s is a function of d_{75} and can be determined from figure 7-4 or equation 7-2. These computations may be carried out using the additional equations provided in appendix B. Because of the interaction of the flow with the vegetal cover, iterative solution of the equations is required and the computations are normally carried out using computer software.

The final step in designing a channel section is to compare the stress on the vegetation with the allowable vegetal stress, τ_{va} . When the allowable stress on the vegetation is the governing parameter, the stress on the soil will be only a small part of the total stress. Therefore, the computed allowable stress is compared to the total hydraulic stress, τ , where

$$\tau = \gamma DS \quad (\text{eq. 7-6})$$

Table 7-3 Properties of grass channel linings; values apply to good uniform stands of each cover^{1/}

Cover factor, C_F	Covers tested	Reference stem density (stem/ft ²)
0.90	Bermudagrass	500
	Centipedegrass	500
0.87	Buffalograss	400
	Kentucky bluegrass	350
	Blue grama	350
0.75	Grass mixture	200
0.5	Weeping lovegrass	350
	Yellow bluestem	250
	Alfalfa ^{2/}	500
	Lespedeza sericea ^{2/}	300
	Common lespedeza	150
	Sudangrass	50

1/ Multiply the stem densities given by 1/3, 2/3, 1, 4/3, and 5/3, for poor, fair, good, very good, and excellent covers, respectively. The equivalent adjustment to C_F remains a matter of engineering judgment until more data are obtained or a more analytic model is developed. A reasonable, but arbitrary, approach is to reduce the cover factor by 20 percent for fair stands and 50 percent for poor stands. C_F values for untested covers may be estimated by recognizing that the cover factor is dominated by density and uniformity of cover near the soil surface. Thus, the sod-forming grasses near the top of the table exhibit higher C_F values than the bunch grasses and annuals near the bottom.

2/ For the legumes tested, the effective stem count for resistance (given) is approximately five times the actual stem count very close to the bed. Similar adjustment may be needed for other unusually large-stemmed, branching, and/or woody vegetation.

Table 7-4 Classification of vegetation cover as to degree of retardance

Retardance	Cover	Condition
A	Weeping lovegrass	Excellent stand, tall (average 30 in)
	Reed canarygrass or	Excellent stand, tall (average 36 in)
	Yellow bluestem ischaemum	
B	Smooth brome grass	Good stand, mowed (average 12 to 15 in)
	Bermudagrass	Good stand, tall (average 12 in)
	Native grass mixture (little bluestem, blue grama, and other long and short midwest grasses)	Good stand, unmowed
	Tall fescue	Good stand, unmowed (average 18 in)
	Sericea lespedeza	Good stand, not woody, tall (average 19 in)
	Grass-legume mixture—Timothy, smooth brome grass, or orchardgrass	Good stand, uncut (average 20 in)
	Reed canarygrass	Good stand, uncut (average 12 to 15 in)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 in)
	Blue grama	Good stand, uncut (average 13 in)
C	Bahiagrass	Good stand, uncut (6 to 8 in)
	Bermudagrass	Good stand, mowed (average 6 in)
	Redtop	Good stand, headed (15 to 20 in)
	Grass-legume mixture—summer (orchardgrass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (6 to 8 in)
	Centipede grass	Very dense cover (average 6 in)
	Kentucky bluegrass	Good stand, headed (6 to 12 in)
D	Bermudagrass	Good stand, cut to 2.5-in height
	Red fescue	Good stand, headed (12 to 18 in)
	Buffalograss	Good stand, uncut (3 to 6 in)
	Grass-legume mixture—fall, spring (orchardgrass, redtop, Italian ryegrass, and common lespedeza)	Good stand, uncut (4 to 5 in)
	Sericea lespedeza or Kentucky bluegrass	Good stand, cut to 2-in height. Very good stand before cutting
E	Bermudagrass	Good stand, cut to 1.5-in height
	Bermudagrass	Burned stubble

Table 7-5 Retardance curve index by retardance class

SCS retardance class	Retardance curve index C_I
A	10.0
B	7.64
C	5.60
D	4.44
E	2.88

650.0704 Sizing channel sections

The channel cross section is normally sized for the minimum cross-sectional area satisfying the stability and capacity requirements for the geometry selected. The channel geometry is selected and the controlling parameters are computed to satisfy stability and capacity design requirements. Table 7-6 shows the typical parameters for design. The parameters specified as optional in table 7-6 influence the design only when the stability requirements would result in an unsuitably narrow cross section. The complete governing equations are given in appendix A, and all notation used throughout this and other sections of this chapter is described in appendix B.

(a) Techniques presented

Design tables are provided covering typical conditions for trapezoidal and parabolic cross sections. For other section shapes, and for use in checking calculations, the full equations are given in appendix A.

For conditions outside the range of parameters covered by the tables and when conditions warrant refinement of the design to better reflect details of the soil

and/or vegetal conditions, the equations of appendix A may be solved directly. Because design generally requires iterative solution of the equation set, a programmed solution is generally appropriate. Waterway Design Tool (WDT) software has been developed to provide these solutions.

Finally, a set of examples demonstrating use of the techniques and also including examples of determining allowable effective stress, curve index, and vegetal stress is provided.

The design tables are intended for use with parabolic or trapezoidal channels and include a range of slopes, discharges, and dimensions and should not be used for situations outside the ranges given. They were developed for curve index numbers corresponding to the traditionally used retardance classes, as shown in table 7-4, and for allowable effective stress values representing a typical range of conditions. At times, it may be advantageous to use the tables to obtain preliminary dimensions and then refine the design using the equations. When using the equations for design, it will be necessary to verify that allowable effective stress is the appropriate design parameter by considering the optional limiting parameters of table 7-6 and the maximum total stress on the vegetation as described in previous sections.

Table 7-6 Cross section properties

Section shape	Required design criteria	Optional criteria	Parameters in design table	Parameters computed from tabular data
Trapezoid	Side slope	Minimum bottom width	Bottom width Depth	Top width
Parabolic	None	Steepest side slope at water's edge	Top width Depth	Parabolic coefficient, a_p Side slope at water's edge
Triangular	None	Minimum side slope	Not available	Use equations to design

(b) Use of the design tables for parabolic and trapezoidal channels

In the absence of precise field data regarding the height and stem density vegetation, it is still considered acceptable to design based on retardance classes. In this case, retardance class D is generally used for stability (shortest and sparsest cover) and B or C are used for capacity (longest and densest cover). Tables for B/D (capacity/stability) and C/D design are presented in appendices C and D.

Use of the tables requires the design discharge, bed slope, type of cover (vegetal cover factor), and soil erodibility (allowable effective stress) to be identified. The numbers in the table are for fine-grained cohesive soils. For other conditions, the design should be checked using the equations.

The table is then selected based on capacity retardance (B or C), soil erodibility, cover factor, and side slope (trapezoidal) and is entered using the bed slope and discharge. The trapezoidal channel design table gives the bottom width and depth (B and D), and the parabolic design table gives the top width and depth (T and D).

For a trapezoid, the top width is computed as:

$$T = B + 2zD \quad (\text{eq. 7-7})$$

For a parabolic channel, the parabolic channel coefficient (a_p) is computed as:

$$a_p = \frac{4D}{T^2} \quad (\text{eq. 7-8})$$

and side slope at the water's edge, that is, point where the water surface meets the channel bank, is computed as:

$$z = \frac{1}{a_p T} \quad (\text{eq. 7-9})$$

If this side slope is steeper than 4:1, modification to the design may be needed, depending on mowing and maintenance requirements.

If the exact slope is not included in the table, there are two approaches possible. The design for the slopes bracketing the exact slope can be computed and the final results found by interpolation. Alternatively, the

next higher slope can be used to determine the minimum width (specific value of a_p) which will ensure stability criteria are met. To ensure adequate capacity, the depth should be increased to that associated with the next flatter slope or determined using the equations in appendix A and the curve index number for capacity. The final top width will increase accordingly. This computation is illustrated for a trapezoidal section in example 3.

If the exact discharge is not found in the table, the next higher discharge should be used. This will result in a slightly over designed channel, but stability and capacity criteria will be met.

(c) Design examples

Example 1

This example illustrates design of a trapezoidal channel and finding the soil effective stress. Find the channel depth, bottom width, and top width for the following design data. Check that the vegetal stress is within the allowable.

Channel parameters:	Trapezoidal section 6:1 side slopes bed slope = 0.75% $Q = 300 \text{ ft}^3/\text{s}$
Soil parameters:	Easily eroded soil (SM with plasticity index of 12 and void ratio of 0.7)
Vegetation parameters:	Bermudagrass ($C_F = 0.9$) B retardance (maximum length approximately 14 in) D retardance (minimum length approximately 4 in)

Solution: The tables may be entered directly with the information given. A portion of the table for B/D design of a channel with bermudagrass or equivalent cover ($C_F=0.9$) over an easily eroded soil ($\tau_a=0.02 \text{ lb/ft}^2$) is shown in figure 7-8. A slope of 0.75 percent and a discharge of 300 cubic feet per second yields a bed width of 24 feet and a flow depth of 2.4 feet as shown in figure 7-8. The top width for the channel is computed as:

$$\begin{aligned} T &= B + 2zD \\ &= 24 + 2(6)(2.4) \\ &= 53 \text{ ft} \end{aligned} \quad (\text{eq. 7-7})$$

Using the more detailed information given, the design may be refined if considered warranted. To do this, first, find allowable effective stress and the void ratio correction using figures 7-6 and 7-7. Using $\tau_{ab} = 0.025$ and $C_e = 0.99$, the allowable effective stress is:

$$\begin{aligned}\tau_a &= \tau_{ab} C_e^2 \\ &= 0.025(0.99) \\ &= 0.025 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-3})$$

Using the reference stem density for bermudagrass from table 7-3 of 500 stems per square foot with the stem lengths given yield retardance curve index values of 7.48 and 4.87, respectively, from equation 7-5. Solving the governing equations for stability and capacity with these values results in a channel section with a bed width of 10 feet and a flow depth of 3 feet with the difference dependent primarily on the larger value of τ_a used in the refined calculations.

$$\begin{aligned}C_1 &= 2.5(h\sqrt{M})^{\frac{1}{3}} \\ &= 2.5(14 \text{ in } \sqrt{500})^{\frac{1}{3}} \\ &= 2.5(1.2 \text{ ft } \sqrt{500})^{\frac{1}{3}} \\ &= 7.48\end{aligned}\quad (\text{eq. 7-5})$$

or

$$\begin{aligned}C_1 &= 2.5(h\sqrt{M})^{\frac{1}{3}} \\ &= 2.5(4 \text{ in } \sqrt{500})^{\frac{1}{3}} \\ &= 2.5(0.33 \text{ ft } \sqrt{500})^{\frac{1}{3}} \\ &= 4.87\end{aligned}$$

Finally, for the refined computations, the vegetal stress should be checked. The allowable vegetal stress is computed as:

$$\begin{aligned}\tau_{va} &= 0.75C_{1(4 \text{ in length})} \\ &= 0.75(4.87) \\ &= 3.65 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-4})$$

Using the quick check for shear stress:

$$\begin{aligned}\tau &= \gamma DS \\ &= 1.12 \text{ lb/ft}^2\end{aligned}\quad (\text{eq. 7-6})$$

Since the total average shear stress is less than the allowable stress on the vegetation, this section can be used for the final design. This check will normally have been programmed into design software and will not require separate checking.

Figure 7-8 Design table for example 1

Input parameters:					
Channel type=trapezoidal					
Cover factor=0.9					
Allowable soil stress=0.02					
B-D design					
Side slope=6					
Q	S=0.1% D(ft) B(ft)	S=0.25% D(ft) B(ft)	S=0.5% D(ft) B(ft)	S=0.75% D(ft) B(ft)	S=1% D(ft) B(ft)
10					
20					
30					
40					
50					
60					
70					
80					
90					
100					
110					
120					
130					2.2 10
140					2.1 11
150					2.1 13
160					2.1 15
170					2.0 16
180					2.0 18
190				2.6 11	2.0 19
200				2.5 12	2.0 21
210				2.5 14	2.0 22
220				2.5 15	2.0 24
230				2.5 16	2.0 25
240				2.4 17	2.0 26
250				2.4 19	1.9 28
260				2.4 20	1.9 29
270				2.4 21	1.9 31
280				2.4 22	1.9 32
290				2.4 23	1.9 33
300		3.4 10	2.4 24		1.9 35
310		3.4 11	2.4 26		1.9 36
320		3.3 12	2.3 27		1.9 38

Example 2

This example illustrates design of a parabolic channel and the addition of 0.5 feet of freeboard. Find the channel depth and top width for the following design data.

Channel parameters: $Q = 100 \text{ ft}^3/\text{s}$
Bed slope $S = 2$ percent

Soil parameters: Erosion resistant soil
($\tau_a = 0.05 \text{ lb}/\text{ft}^2$)

Vegetation: C retardance for capacity
($C_I = 5.60$)
D retardance for stability
($C_I = 4.44$)
Grass mixture ($C_F = 0.75$)

Solution: Using the appropriate C/D table (fig. 7-9) and entering the table with $Q = 100 \text{ ft}^3/\text{s}$ and $S = 2\%$, the design depth and top width are $D = 1.2 \text{ ft}$ and $T = 37 \text{ ft}$. The channel parabolic coefficient (which is needed for finding the new top width once the 0.5 ft of freeboard are added) is found using equation 7-8:

$$a_p = \frac{4D}{T^2}$$

$$= \frac{4(1.2)}{(37)^2}$$

$$= 0.0035$$
(eq. 7-8)

The side slope at the water's edge can now be found using equation 7-9:

$$Z = \frac{1}{a_p T}$$

$$= \frac{1}{(0.0035)(37)}$$

$$= 7.7$$
(eq. 7-9)

With the 0.5 feet of freeboard, the total section depth, D_T , will be equal to 1.7 feet. The final top width of the excavated section is computed as:

$$D_T = 1.2 + 0.5$$

$$= 1.7 \text{ ft}$$

$$T = \sqrt{\frac{4D_T}{a_p}}$$

$$= \sqrt{\frac{4(1.7)}{0.0035}}$$

$$= 44.1 \text{ ft}$$
(eq. 7-8)

A final check of the side slope is computed using $T = 44.1 \text{ feet}$.

$$z_f = \frac{1}{a_p T_f}$$

$$= \frac{1}{(0.0035)(44.1)}$$

$$= 6.5$$

Figure 7-9 Design table for example 2

Input parameters: Channel type=parabolic Cover factor=0.75 Allowable soil stress=0.05 C-D design												
Q	S=0.1%		S=0.25%		S=0.5%		S=0.75%		S=1%		S=1.25%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10	1.1	95	1.6	10	1.5	8						
20	1.5	110	2	11								
30	1.6	116	2.3	12								
40	1.6	121	2.5	13								
50	1.7	124							1.8	11	1.6	11
60	1.7	128							1.8	13	1.6	13
70	1.8	125					2.2	13	1.8	16	1.6	18
80	1.9	127					2.2	14	1.8	18	1.6	21
90	1.9	130					2.2	16	1.8	20	1.6	24
100	1.9	132					2.2	18	1.8	22	1.6	26
110	2	134					2.2	20	1.8	24	1.6	29
120	3.3	33			2.9	16	2.2	21	1.8	27	1.6	32
											1.4	30
											1.4	33
											1.3	37
											1.3	40
											1.2	44
											1.2	41
											1.2	39
											1.2	37
											1.2	35
											1.2	33
											1.2	31
											1.2	29
											1.2	27
											1.2	25
											1.2	23
											1.2	21
											1.2	19
											1.2	17
											1.2	15
											1.2	13
											1.2	11
											1.2	9
											1.2	7
											1.2	5
											1.2	3

Example 3

This example illustrates using the tables to do stability and capacity design for a slope that is not listed. A similar approach may be used to interpolate for other parameters as appropriate.

Channel parameters: Trapezoidal channel
4:1 side slopes
Bed slope = 0.85 percent
 $Q = 160 \text{ ft}^3/\text{s}$

Soil parameters: Erodible soil ($\tau_a = 0.03 \text{ lb}/\text{ft}^2$)

Vegetal parameters: C retardance for capacity
($C_I = 5.60$)
D retardance for stability
($C_I = 4.44$)
Grass mixture ($C_F = 0.75$)

Solution: To get the bottom width, the C/D table is entered using $S = 1$ percent. Figure 7-10 shows that the bottom width B should be 35 feet. Also from figure 7-10, for a slope equal to 0.75 percent, we get a trial capacity depth of 1.5 feet.

To find a more accurate capacity depth, start with the trial depth $D = 1.5$, $B = 35$, and $S = 0.0085 \text{ ft}/\text{ft}$, and compute area (A), hydraulic radius (R), trial velocity (V_T), and n . Then use Manning's formula to check velocity. If the velocity computed with Manning's (V_M) is higher, deduct 0.1 foot from the depth and repeat. Keep deducting 0.1 foot until the Manning's velocity is less than the trial velocity. The exact depth will be between the values obtained in the last two steps, and the higher value should be used in the design. The computations are:

$$\begin{aligned} A &= BD + zD^2 \\ &= 35(1.5) + 4(1.5)^2 \\ &= 61.5 \text{ ft}^2 \end{aligned} \quad (\text{table 7B-3})$$

$$\begin{aligned} R &= \frac{A}{B + 2D\sqrt{z^2 + 1}} \\ &= \frac{61.5}{35 + 2(1.5)\sqrt{4^2 + 1}} \\ &= 1.298 \end{aligned}$$

$$\begin{aligned} V_T &= \frac{Q}{A} \\ &= \frac{160}{61.5} \\ &= 2.60 \text{ ft/s} \end{aligned}$$

$$\begin{aligned} n &= \exp \left\{ C_I \left(0.0133 [\ln(VR)]^2 - 0.0954 [\ln(VR)] + 0.297 \right) - 4.16 \right\} \\ &= 0.0479 \end{aligned} \quad (\text{table 7B-2})$$

where:

$$\begin{aligned} C_I &= 5.60 \\ V &= 2.60 \text{ ft/s} \\ R &= 1.298 \end{aligned}$$

$$\begin{aligned} V_m &= \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}} \\ &= \frac{1.49}{0.0479} (1.298)^{\frac{2}{3}} (0.0085)^{\frac{1}{2}} \\ &= 3.40 \end{aligned} \quad (\text{table 7B-2})$$

Table 7-7 lists the results of the remainder of the computations.

Since the difference changes from positive to negative between $D=1.3$ and $D=1.2$ feet, a depth of 1.3 feet should be used in the final design. As a final step, vegetal stress is checked, and the stress, τ , is found to be less than the allowable vegetal stress, τ_{va} .

$$\begin{aligned} \tau_{va} &= 0.75 C_I \\ &= 0.75(5.60) \\ &= 4.2 \end{aligned} \quad (\text{eq. 7-4})$$

$$\begin{aligned} \tau &= \gamma DS \\ &= 62.4(1.3)(0.0085) \\ &= 0.69 \end{aligned} \quad (\text{eq. 7-6})$$

Figure 7-10 Design table for example 3

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															
70															
80															
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390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Table 7-7 Trial and error solution for example 3

Discharge, Q	160	160	160	160
Slope, S	0.0085	0.0085	0.0085	0.0085
Depth, D	1.5	1.4	1.3	1.2
Bottom width, B	35	35	35	35
Side slope, z	4	4	4	4
Area, A	61.5	56.84	52.26	47.76
Hydraulic radius, R	1.298	1.221	1.143	1.064
V_T , Q/A	2.602	2.815	3.062	3.350
C_I	5.6	5.6	5.6	5.6
n	0.048	0.048	0.047	0.047
V_M , Manning's	3.401	2.286	3.166	3.038
Difference: $V_M - V_T$	0.799	0.471	0.104	-0.312

650.0705 Layout and construction

(a) Layout

The layout of the waterway should begin at a key point. Usually, this is the outlet, but it may be a point determined by a building, property boundary, gully, or other landscape feature.

(b) Adjustment and marking

After the centerline has been staked, check and move some stakes, if necessary, to avoid landscape features or to improve alignment. The waterway should then be staked for construction. Mark all existing vegetation (trees, shrubs) and other landscape features to be protected during construction.

(c) Site preparation

A good time to build waterways is when the site has a good cover so that runoff and sedimentation will be at a minimum. All debris and vegetation not marked for retention should be removed from the site and disposed of in such a manner that does not adversely affect the environment or proper function of the waterway. For typical design and construction survey notes, see EFH 650.01. Soil may also be used as berms along the sides of the waterway.

(d) Excavation

The soil removed from the waterway should be deposited where it will not interfere with the flow of water into the waterway. Normally, the soil can be shaped and graded to fill low spots in the nearby fields or mounded to create visual interest and screening or to reduce noise and control wind.

The topsoil may be saved and spread in the constructed waterway if necessary for obtaining a good vegetative cover. Where this is done, the waterway should be overexcavated to allow for replacement of the topsoil without encroaching on the design cross section.

(e) Equipment

Many kinds of farming and construction equipment are adapted to the construction of waterways. However, it may be necessary to use equipment that will load and transport the excavated material to locations where it is needed, such as low spots in the surrounding field or washes in the waterway. Although scrapers that can be pulled by farm tractors are satisfactory for waterway construction, large self-propelled scrapers, bulldozers, and motor graders are the preferred equipment.

(f) Appurtenant structures

Effective vegetated waterways are not subjected to low flows of long duration nor kept wet for long periods. Subsurface drains, underground outlets, stone center drains, or other means of providing drainage and protecting the center of the waterway should be considered where low flows or wet conditions are prolonged.

(1) Subsurface drains

Subsurface drains should parallel the center of the vegetated waterway but be offset from the centerline at least a fourth of the top width of the waterway. Two drains may be required in some cases, one on each side of the center. The principles outlined in EFH 650.14 should be followed in designing and installing the subsurface drains. The subsurface drains may be outletted through a drop structure at the end of the waterway or through a standard pipe outlet.

(2) Underground outlets

Underground outlets can be used to carry prolonged low flows. Buried conduits with surface inlets are frequently used downstream of highway culverts or other locations where low flows are concentrated. Blind inlets are sometimes used, but they frequently become a maintenance problem.

(3) Stone center drains

In areas where field stones or other sources of rock are plentiful, a stone center drain may be the best solution to problems of prolonged flow and wetness. A gravel bedding or filter fabric (nonwoven geotextile) is commonly used under the rock to prevent erosion of the underlying soil. These drains are installed as shown in figure 7-11. An alternate cross section would have a stone center that could carry the flow from a

1-year, 24-hour event. Required stone size can be computed using techniques for sizing riprap found in EFH 650.16 or Hydraulic Engineering Circular 11 (FHWA 1989).

(4) Filter fabric barriers

The stability of grassed waterways is based on the establishment of vegetation within the constructed channel's boundaries. Until grass can be established, the waterway is subject to failure from rainfall events significantly less than the design storm. Installing filter fabric in the waterway immediately after the waterway has been constructed is one approach used to minimize the erosive damage caused by untimely rainfall events before the vegetation is established. The barriers are a light weight nonwoven filter fabric (geotextile) plowed into the waterway perpendicular to the direction of flow at intervals ranging from 50 to 100 feet (fig. 7-12).

(g) Postconstruction protection of channel lining

If vegetation is to be used for erosion protection, it should be established as soon after construction as weather conditions permit. (Check Field Office Technical Guide for local planting dates.) Prepare a seedbed

and seed with a mixture of grasses and legumes adapted to soil conditions and local climate. Most excavated areas will require fertilizers to establish good cover. If weather conditions are not favorable for permanent seeding, it may be necessary to use a temporary seeding, mulch, or lining. Irrigation may be needed to assure adequate germination and growth initially. If an immediate turf cover is desired or if it is difficult to establish turf from seed, it may be necessary to use sod. Sodding by sprigging or broadcasting root stalks and stolons gives good results with bermudagrass and other grasses in favorable climates. In other areas, direct planting of sod in strips is practical. Woody plantings may be appropriate on channel back slopes to improve screening, wildlife habitat, space definition, and climate control (fig. 7-13). Check Field Office Technical Guides for tree planting dates.

Mulching materials such as straw, hay, jute, paper, or plastic mesh should be used to protect new seeding. At least the center-third portion of the cross section should be anchored. If temporary seedings or nurse crops are used, they should be mowed to reduce competition to permanent seeding. All seeding, planting, sodding, and mulching should conform to standards as given in the local Field Office Technical Guide.

Figure 7-11 Installation of stone center drain

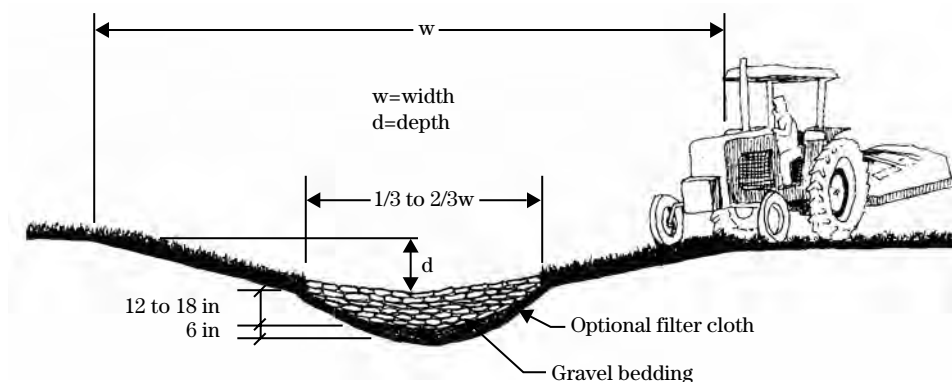
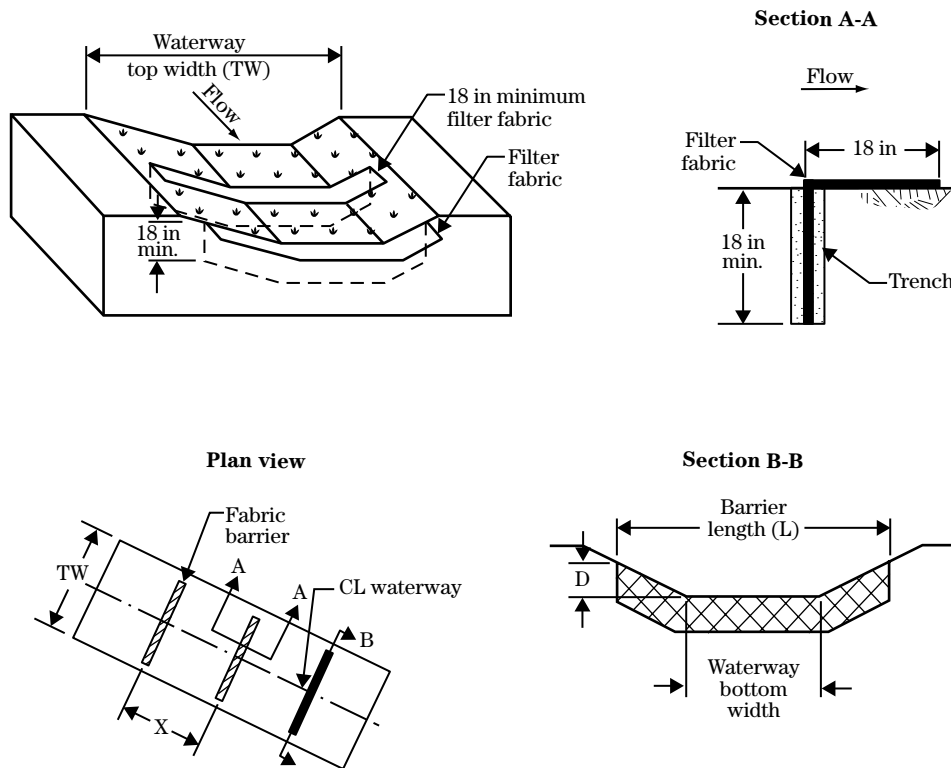


Figure 7-12 Fabric barrier

Barrier depth (D)
Barrier spacing (X)
Barrier length (L)

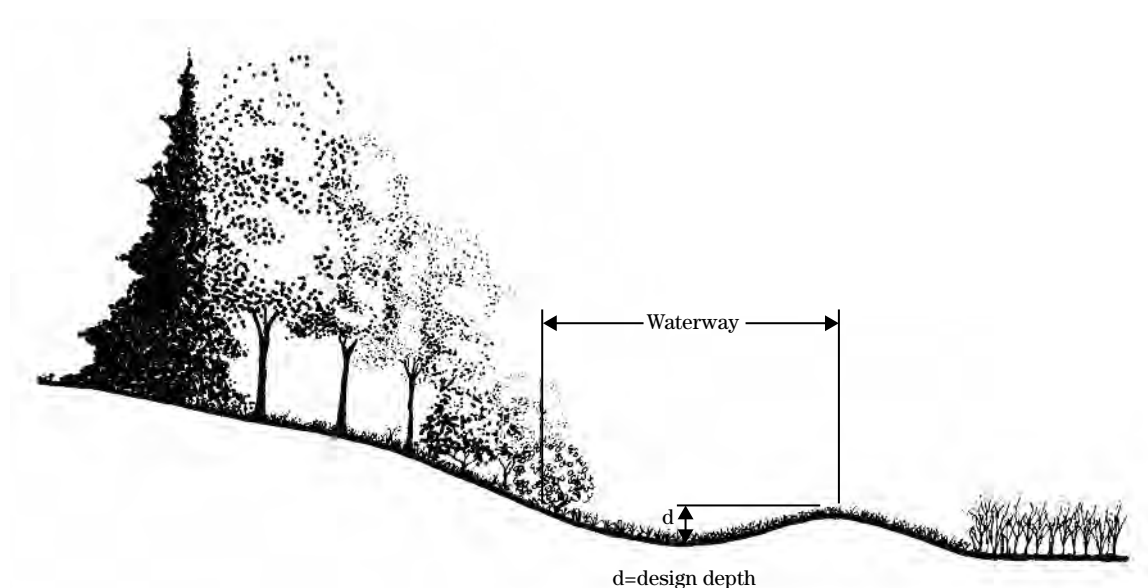
Notes

Fabric barriers are 36 inches wide with 18 inches of the fabric buried and anchored with compacted soil; lay the remaining 18 inches of fabric down the watercourse in the direction of the waterflow. After installation, compact the trench with rear tractor tire; the geotextile shall meet the requirements of NRCS Material Specification 592—Geotextile (ms592), class III nonwoven geotextile. Barriers need to be completed within 14 days after construction check-out. It is recommended that installation be done after seeding.

The waterway may be protected by using a combination of the following steps that best fits the needs of the site:

- Reduce the required capacity by dividing the runoff between two or more waterways.
- Construct and vegetate the waterway before any other channels or structures are allowed to discharge into it.
- Carry prolonged low flows in a subsurface drainage system or in a surface-protected section such as a stone center.
- When possible, divert major flows from the waterway during establishment period.
- Maintain vegetative cover by mowing, spraying, fertilizing, and performing other maintenance as needed.

Figure 7-13 Use of woody plantings



650.0706 Maintenance

(a) General

Timely maintenance is important for keeping a waterway in good working condition. Recommended maintenance generally includes mowing of waterways and removing vegetation so as not to retard water flow and cause excessive sedimentation in the channel. Timely mowing is critical for wildlife. The cool-season grasses typically should be fertilized for hay production, while the native grasses may not need fertilizer. Very often herbicides in field runoff can kill introduced grass species, while native grasses may not be affected as much by this problem. Grazing, if permitted, should be rigidly controlled. Livestock should be excluded during wet periods. Vehicular traffic should be excluded except at designated crossings.

(b) Removal of sediment

The waterway channel may require maintenance to remove small sediment deposits. However, if the deposit extends over long reaches or for the full length of the waterway, the channel should be reconstructed by use of appropriate construction equipment. Sediment should be used onsite or disposed of properly.

(c) Repair work

Eroded areas or damage to lining materials should be repaired promptly. This will prevent or reduce further degradation of the waterway system.

The transition section of waterway outlets is the most susceptible to erosion damage. Repairs should be made promptly to prevent gulying from advancing up the waterway channel. If vegetation proves inadequate in the transition section, it may be necessary to line this section of channel or construct a grade stabilization structure.

Where underground outlets are used, it is important to keep the outlet free of trash that may plug it and cause failure.

650.0707 References

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Table 7A-1 Description of symbols

Symbol	Description
A	Cross section area, ft ²
a _p	Parabolic coefficient (determines shape of parabola)
B	Bottom width of trapezoidal channel, ft
C _e	Correction for void ratio
C _F	Vegetal cover factor
C _I	Retardance curve index
D	Maximum depth of flow in cross section, ft
d ₇₅	75th percentile particle diameter, in
D _T	Section depth after addition of freeboard, ft
e	Void ratio
h	Representative height of vegetation, ft
I _w	Plasticity index
M	Stem density, stems/ft ²
n	Manning's roughness coefficient
n _s	Roughness associated with soil grain size
Q	Discharge in channel, ft ³ /s (cfs)
R	Hydraulic radius, ft
S	Channel bed slope, ft/ft
T	Top width of trapezoidal or parabolic channel, ft
V _M	Velocity computed with Manning's equation
V _T	Average section velocity, Q/A (trial value in iterative solution)
z	Side slope
γ	Unit weight of water, 62.4 lb/ft ³
τ	Maximum hydraulic stress, lb/ft ²
τ _a	Allowable effective stress on soil, lb/ft ²
τ _{ab}	Basic allowable stress on soil, before correction for void ratio, lb/ft ²
τ _e	Erosionally effective stress on soil, lb/ft ²
τ _{va}	Allowable stress on vegetation, lb/ft ²

Blank

Table 7B-1 Equations for determining allowable effective stress

Soil classification	Applicable range	Equation
Noncohesive soils	$I_w < 10$	
GW, GP, SW, SP	$d_{75} < 0.05$	$n_s = 0.0156$ $\tau_a = 0.02$
	$d_{75} \geq 0.05$	$n_s = 0.0256d_{75}^{\frac{1}{6}}$ $\tau_a = 0.4d_{75}$
Cohesive soils	$I_w > 10$	$n_s = 0.0156$ $\tau_a = \tau_{ab} C_e^2$
GM, SC		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 14.3I_w + 47.7) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.076$
GC		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 2.86I_w + 42.9) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.119$
SM		$C_e = 1.42 - 0.61e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$
CH		$C_e = 1.38 - 0.373e$
		$\tau_{ab} = 0.0966$

Table 7B-1 Equations for determining allowable effective stress—Continued

Soil classification	Applicable range	Equation
CL		$C_e = 1.48 - 0.57e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 14.3I_w + 47.7) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.076$
MH		$C_e = 1.38 - 0.373e$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 1.43I_w + 10.7) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.058$
ML		$C_e = 1.48 - 0.57e$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$
OH		$C_e = 1.0$
	$10 < I_w < 20$	$\tau_{ab} = (1.0477I_w^2 + 1.43I_w + 10.7) \times 10^{-3}$
	$I_w > 20$	$\tau_{ab} = 0.058$
OL		$C_e = 1.0$
	$10 < I_w < 20$	$\tau_{ab} = (1.07I_w^2 + 7.15I_w + 11.9) \times 10^{-4}$
	$I_w > 20$	$\tau_{ab} = 0.058$

Table 7B-2 Governing hydraulic equations**Basic hydraulic equations**

Manning's n	$n = \exp \left\{ C_I \left(0.0133 [\ln(VR)]^2 - 0.0954 [\ln(VR)] + 0.297 \right) - 4.16 \right\}$
Velocity (Manning's formula)	$V = \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$
Unit discharge, or discharge per unit width	$q = \frac{Q}{T} = VD$

Stable unit discharge equations

Condition(s)	Equation	Parameters
$0.0025C_I^{2.5} \leq q \leq 36$ and $\gamma DS \leq \tau_{va} + \tau_e$	$q = \exp \left\{ \frac{-b - \sqrt{b^2 - 4ac}}{2a} \right\}$	$a = 0.0133C_I$
		$b = -(0.0954C_I + 0.429)$
		$c = 0.297C_I - 0.5 \ln(S) + 0.714 \ln \left\{ \frac{\tau_a}{(1 - C_F)n_s^2} \right\} - 6.94$
$q < 0.0025C_I^{2.5}$ or $q > 36$ and $\gamma DS \leq \tau_{va} + \tau_e$	$q = \frac{0.0015 \tau_a^{\frac{5}{3}} n^{\frac{7}{3}}}{(1 - C_F)^{\frac{5}{3}} n_s^{\frac{10}{3}} S^{\frac{7}{6}}}$	n computed with eq.: for $q < 0.0025C_I^{2.5}$ then $VR = 0.0025C_I^{2.5}$; for $q > 36$ then $VR = 36$
$0.0025C_I^{2.5} \leq q \leq 36$ and $\gamma DS \geq \tau_{va} + \tau_e$ (stress on vegetation controls)	$q = \exp \left\{ \frac{-b - \sqrt{b^2 - 4ac}}{2a} \right\}$	$a = 0.0133C_I$
		$b = -(0.0954C_I + 0.429)$
		$c = 0.297C_I - 1.67 \ln(\tau_{va}) + 1.17 \ln(S) + 2.33$
neither $0.0025C_I^{2.5} \leq q \leq 36$ or $\gamma DS \leq \tau_{va} + \tau_e$ is satisfied	$q = \frac{0.0015 \tau_{va}^{\frac{5}{3}}}{n S^{\frac{7}{6}}}$	$n = \exp(0.126C_I - 4.16)$

Table 7B-3 Cross section geometry equations

Area—trapezoidal channel	$A = BD + zD^2$
Area—parabolic channel	$A = \frac{D^{\frac{3}{2}}}{.75\sqrt{a_p}}$
Depth— trapezoidal channel	$D = \frac{-B\sqrt{B^2 + 4Az}}{2z}$
Depth—parabolic channel	$D = \left(0.75A\sqrt{a_p}\right)^{\frac{2}{3}}$
Hydraulic radius—trapezoidal channel	$R = \frac{A}{B + 2D\sqrt{z^2 + 1}}$
Hydraulic radius—parabolic channel	$R = \frac{A}{\sqrt{4D^2 + \frac{D}{a_p}} + \frac{1}{2a_p} \ln\left(\sqrt{4a_p D} + \sqrt{4a_p D + 1}\right)}$

Appendix C

Design Tables for Trapezoidal Channels

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																				0.8	11									
20									1.3	11	1.1	13	1	15	0.9	17	0.9	19	0.7	25	0.7	14	0.6	16	0.6	18	0.5	21		
30									1.2	18	1.1	21	1	24	0.9	27	0.8	29	0.7	38	0.6	45	0.6	51	0.6	56				
40					1.7	13	1.3	20	1.2	25	1	29	1	33	0.9	36	0.8	39	0.7	51	0.6	60	0.6	68	0.5	75				
50					1.7	18	1.3	25	1.1	31	1	37	0.9	41	0.9	46	0.8	50	0.7	64	0.6	75	0.6	85	0.5	94				
60					1.6	22	1.3	31	1.1	38	1	44	0.9	50	0.9	55	0.8	60	0.7	77	0.6	90								
70			2.6	13	1.6	27	1.3	37	1.1	45	1	52	0.9	59	0.9	65	0.8	70	0.7	90										
80			2.5	16	1.6	31	1.3	42	1.1	52	1	60	0.9	67	0.9	74	0.8	81												
90			2.5	19	1.6	36	1.3	48	1.1	59	1	68	0.9	76	0.9	84	0.8	91												
100			2.4	21	1.6	40	1.3	54	1.1	65	1	76	0.9	85	0.9	93														
110			2.4	24	1.6	45	1.3	60	1.1	72	1	83	0.9	93																
120			2.3	27	1.6	49	1.3	65	1.1	79	1	91																		
130			2.3	30	1.5	53	1.3	71	1.1	86	1	99																		
140			2.3	33	1.5	58	1.3	77	1.1	93																				
150			2.3	35	1.5	62	1.3	82	1.1	99																				
160			2.3	38	1.5	66	1.3	88																						
170	4.5	11	2.3	41	1.5	71	1.3	93																						
180	4.4	13	2.2	44	1.5	75	1.3	99																						
190	4.4	15	2.2	46	1.5	79																								
200	4.3	16	2.2	49	1.5	84																								
210	4.3	18	2.2	52	1.5	88																								
220	4.2	19	2.2	55	1.5	92																								
230	4.2	21	2.2	57	1.5	97																								
240	4.2	22	2.2	60																										
250	4.1	24	2.2	63																										
260	4.1	25	2.2	65																										
270	4.1	27	2.2	68																										
280	4.1	28	2.2	71																										
290	4	30	2.2	74																										
300	4	31	2.2	76																										
310	4	33	2.2	79																										
320	4	34	2.2	82																										
330	4	35	2.2	84																										
340	4	37	2.2	87																										
350	4	38	2.2	90																										
360	3.9	40	2.2	93																										
370	3.9	41	2.2	95																										
380	3.9	43	2.2	98																										
390	3.9	44																												
400	3.9	45																												
410	3.9	47																												
420	3.9	48																												
430	3.9	50																												
440	3.9	51																												
450	3.9	52																												
460	3.9	54																												
470	3.9	55																												
480	3.8	56																												
490	3.8	58																												
500	3.8	59																												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																			0.8	11	0.7	14	0.6	16	0.6	18	0.5	21		
20											1.1	12	1	14	0.9	16	0.9	18	0.7	24	0.6	29	0.6	33	0.6	37	0.5	43		
30							1.4	12	1.2	17	1.1	20	1	23	0.9	26	0.9	29	0.7	37	0.6	44	0.6	50	0.6	56				
40					1.8	11	1.4	18	1.2	24	1	28	1	32	0.9	36	0.8	39	0.7	50	0.6	60	0.6	68	0.5	75				
50					1.7	16	1.3	24	1.1	30	1	36	0.9	41	0.9	45	0.8	49	0.7	63	0.6	75	0.6	85	0.5	94				
60					1.7	21	1.3	30	1.1	37	1	44	0.9	49	0.9	55	0.8	60	0.7	76	0.6	90								
70					1.6	25	1.3	36	1.1	44	1	52	0.9	58	0.9	64	0.8	70	0.7	89										
80			2.7	12	1.6	30	1.3	41	1.1	51	1	59	0.9	67	0.9	74	0.8	80												
90			2.6	15	1.6	34	1.3	47	1.1	58	1	67	0.9	76	0.9	83	0.8	90												
100			2.5	18	1.6	39	1.3	53	1.1	65	1	75	0.9	84	0.9	93														
110			2.5	22	1.6	43	1.3	59	1.1	71	1	83	0.9	93																
120			2.4	24	1.6	48	1.3	64	1.1	78	1	90																		
130			2.4	27	1.6	52	1.3	70	1.1	85	1	98																		
140			2.3	30	1.5	56	1.3	76	1.1	92																				
150			2.3	33	1.5	61	1.3	81	1.1	99																				
160			2.3	36	1.5	65	1.3	87																						
170			2.3	39	1.5	69	1.3	93																						
180			2.3	42	1.5	74	1.3	98																						
190			2.3	44	1.5	78																								
200			2.3	47	1.5	83																								
210	4.6	10	2.2	50	1.5	87																								
220	4.5	12	2.2	53	1.5	91																								
230	4.5	14	2.2	55	1.5	96																								
240	4.4	16	2.2	58	1.5	100																								
250	4.4	17	2.2	61																										
260	4.3	19	2.2	64																										
270	4.3	21	2.2	66																										
280	4.2	23	2.2	69																										
290	4.2	24	2.2	72																										
300	4.2	26	2.2	75																										
310	4.1	27	2.2	77																										
320	4.1	29	2.2	80																										
330	4.1	31	2.2	83																										
340	4.1	32	2.2	85																										
350	4.1	34	2.2	88																										
360	4	35	2.2	91																										
370	4	37	2.2	94																										
380	4	38	2.2	96																										
390	4	40	2.2	99																										
400	4	41																												
410	4	43																												
420	4	44																												
430	3.9	45																												
440	3.9	47																												
450	3.9	48																												
460	3.9	50																												
470	3.9	51																												
480	3.9	53																												
490	3.9	54																												
500	3.9	55																												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																			0.8	10										
20											1.1	11	1	13	0.9	15	0.9	17	0.7	24	0.7	13	0.6	15	0.6	17	0.5	21		
30											1.1	19	1	22	0.9	25	0.9	28	0.7	37	0.6	44	0.6	33	0.6	37	0.5	43		
40											1	27	1	31	0.9	35	0.8	38	0.7	50	0.6	59	0.6	50	0.6	56				
50											1	35	0.9	40	0.9	45	0.8	49	0.7	63	0.6	74	0.6	67	0.6	75				
60					1.8	14					1	43	0.9	49	0.9	54	0.8	59	0.7	76	0.6	90	0.6	85	0.5	94				
70					1.7	19					1	51	0.9	58	0.9	64	0.8	69	0.7	89										
80					1.7	24					1	59	0.9	66	0.9	73	0.8	80												
90			2.8	10	1.6	28					1	66	0.9	75	0.9	83	0.8	90												
100			2.7	14	1.6	33					1	74	0.9	84	0.9	92	0.8	100												
110			2.6	18	1.6	37					1	82	0.9	92																
120			2.6	18	1.6	42					1	90																		
130			2.5	21	1.6	46					1	98																		
140			2.5	24	1.6	51																								
150			2.4	27	1.6	55																								
160			2.4	30	1.5	60																								
170			2.4	33	1.5	64																								
180			2.3	36	1.5	68																								
190			2.3	39	1.5	73																								
200			2.3	42	1.5	77																								
210			2.3	45	1.5	81																								
220			2.3	48	1.5	86																								
230			2.3	51	1.5	90																								
240			2.3	53	1.5	95																								
250			2.2	56	1.5	99																								
260			2.2	59																										
270	4.7	10	2.2	62																										
280	4.6	12	2.2	64																										
290	4.5	14	2.2	67																										
300	4.5	16	2.2	70																										
310	4.4	18	2.2	73																										
320	4.4	20	2.2	75																										
330	4.3	22	2.2	78																										
340	4.3	24	2.2	81																										
350	4.2	26	2.2	84																										
360	4.2	28	2.2	86																										
370	4.2	29	2.2	89																										
380	4.2	31	2.2	92																										
390	4.1	33	2.2	95																										
400	4.1	34	2.2	97																										
410	4.1	36	2.2	100																										
420	4.1	37																												
430	4.1	39																												
440	4	41																												
450	4	42																												
460	4	44																												
470	4	45																												
480	4	47																												
490	4	48																												
500	4	50																												
510	4	51																												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20							1.1 10	1 11	1 12	0.8 17	0.7 21	0.7 11	0.6 13	0.5 15	
30							1.1 16	1 18	0.9 20	0.8 26	0.7 32	0.6 24	0.6 27	0.5 32	
40					1.6 12	1.3 16	1.2 19	1 22	1 25	0.9 27	0.8 36	0.7 43	0.6 36	0.6 40	0.5 48
50			2.1 10	1.5 16	1.3 21	1.1 25	1 28	1 31	0.9 34	0.8 45	0.7 54	0.6 49	0.6 54	0.5 64	
60			2 13	1.5 20	1.3 25	1.1 30	1 34	1 38	0.9 42	0.7 54	0.7 65	0.6 74	0.6 82	0.5 97	
70			1.9 16	1.5 24	1.3 30	1.1 36	1 40	0.9 45	0.9 49	0.7 64	0.7 76	0.6 86	0.6 96		
80			1.9 19	1.5 28	1.2 35	1.1 41	1 46	0.9 52	0.9 56	0.7 73	0.7 87	0.6 99			
90			1.8 22	1.4 32	1.2 40	1.1 46	1 53	0.9 58	0.9 64	0.7 82	0.7 98				
100		3.1 10	1.8 25	1.4 36	1.2 44	1.1 52	1 59	0.9 65	0.9 71	0.7 91					
110		3 12	1.8 28	1.4 39	1.2 49	1.1 57	1 65	0.9 72	0.9 78						
120		2.9 14	1.8 31	1.4 43	1.2 54	1.1 63	1 71	0.9 78	0.9 85						
130		2.9 16	1.8 34	1.4 47	1.2 58	1.1 68	1 77	0.9 85	0.9 93						
140		2.9 18	1.8 37	1.4 51	1.2 63	1.1 74	1 83	0.9 92	0.9 100						
150		2.8 20	1.8 40	1.4 55	1.2 68	1.1 79	1 89	0.9 98							
160		2.8 22	1.8 43	1.4 59	1.2 72	1.1 84	1 95								
170		2.8 24	1.8 46	1.4 63	1.2 77	1.1 90									
180		2.8 25	1.7 49	1.4 67	1.2 82	1.1 95									
190		2.7 27	1.7 52	1.4 71	1.2 86										
200		2.7 29	1.7 55	1.4 74	1.2 91										
210		2.7 31	1.7 58	1.4 78	1.2 96										
220		2.7 33	1.7 61	1.4 82											
230		2.7 34	1.7 64	1.4 86											
240		2.7 36	1.7 67	1.4 90											
250		2.7 38	1.7 69	1.4 94											
260		2.6 40	1.7 72	1.4 98											
270		2.6 42	1.7 75												
280		2.6 44	1.7 78												
290	5.4 10	2.6 45	1.7 81												
300	5.4 11	2.6 47	1.7 84												
310	5.3 12	2.6 49	1.7 87												
320	5.3 13	2.6 51	1.7 90												
330	5.3 14	2.6 52	1.7 93												
340	5.2 15	2.6 54	1.7 96												
350	5.2 16	2.6 56	1.7 99												
360	5.2 17	2.6 58													
370	5.1 18	2.6 60													
380	5.1 19	2.6 61													
390	5.1 20	2.6 63													
400	5.1 21	2.6 65													
410	5.1 22	2.6 67													
420	5 23	2.6 68													
430	5 24	2.6 70													
440	5 25	2.6 72													
450	5 26	2.6 74													
460	5 27	2.5 75													
470	5 27	2.5 77													
480	4.9 28	2.5 79													
490	4.9 29	2.5 81													
500	4.9 30	2.5 83													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																							0.7	11	0.6	12	0.5	15			
20															1.1	10	1	11	0.8	16	0.7	20	0.6	23	0.6	26	0.5	31			
30											1.2	12	1.1	15	1	17	0.9	19	0.8	26	0.7	31	0.6	36	0.6	40	0.5	48			
40							1.7	10	1.3	14	1.2	18	1.1	21	1	24	0.9	26	0.8	35	0.7	42	0.6	48	0.6	54	0.5	64			
50							1.6	14	1.3	19	1.1	24	1	27	1	31	0.9	34	0.8	44	0.7	53	0.6	61	0.6	68	0.5	80			
60					2.1	10	1.5	18	1.3	24	1.1	29	1	34	1	37	0.9	41	0.7	54	0.7	64	0.6	73	0.6	82	0.5	96			
70					2	14	1.5	22	1.3	29	1.1	35	1	40	0.9	44	0.9	48	0.7	63	0.7	75	0.6	86	0.6	96					
80					1.9	17	1.5	26	1.2	34	1.1	40	1	46	0.9	51	0.9	56	0.7	72	0.7	86	0.6	98							
90					1.9	20	1.5	30	1.2	39	1.1	46	1	52	0.9	58	0.9	63	0.7	82	0.7	97									
100					1.9	23	1.4	34	1.2	43	1.1	51	1	58	0.9	64	0.9	70	0.7	91											
110					1.8	26	1.4	38	1.2	48	1.1	56	1	64	0.9	71	0.9	78	0.7	100											
120					1.8	29	1.4	42	1.2	53	1.1	62	1	70	0.9	78	0.9	85													
130			3.1	11	1.8	32	1.4	46	1.2	57	1.1	67	1	76	0.9	84	0.9	92													
140			3	14	1.8	36	1.4	50	1.2	62	1.1	73	1	82	0.9	91	0.9	99													
150			3	16	1.8	38	1.4	54	1.2	67	1.1	78	1	88	0.9	98															
160			2.9	18	1.8	41	1.4	58	1.2	72	1.1	84	1	94																	
170			2.9	20	1.8	44	1.4	62	1.2	76	1.1	89	1	100																	
180			2.9	22	1.8	48	1.4	66	1.2	81	1.1	94																			
190			2.8	24	1.8	50	1.4	70	1.2	86	1.1	100																			
200			2.8	26	1.7	53	1.4	73	1.2	90																					
210			2.8	28	1.7	56	1.4	77	1.2	95																					
220			2.8	30	1.7	59	1.4	81	1.2	100																					
230			2.8	32	1.7	62	1.4	85																							
240			2.7	34	1.7	65	1.4	89																							
250			2.7	35	1.7	68	1.4	93																							
260			2.7	37	1.7	71	1.4	97																							
270			2.7	39	1.7	74																									
280			2.7	41	1.7	77																									
290			2.7	43	1.7	80																									
300			2.7	45	1.7	83																									
310			2.6	47	1.7	86																									
320			2.6	48	1.7	89																									
330			2.6	50	1.7	92																									
340			2.6	52	1.7	95																									
350			2.6	54	1.7	98																									
360			2.6	56	1.7	100																									
370			2.6	57																											
380	5.5	10	2.6	59																											
390	5.4	11	2.6	61																											
400	5.4	12	2.6	63																											
410	5.4	13	2.6	64																											
420	5.3	14	2.6	66																											
430	5.3	15	2.6	68																											
440	5.3	17	2.6	70																											
450	5.2	18	2.6	72																											
460	5.2	19	2.6	73																											
470	5.2	20	2.6	75																											
480	5.1	21	2.6	77																											
490	5.1	22	2.6	79																											
500	5.1	23	2.6	80																											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10												0.7 10	0.6 12	0.5 15	
20									1 10	0.8 16	0.7 20	0.6 23	0.6 26	0.5 31	
30						1.3 11	1.1 14	1 16	0.9 18	0.8 25	0.7 31	0.6 36	0.6 40	0.5 47	
40						1.4 13	1.2 17	1 23	0.9 26	0.8 35	0.7 42	0.6 48	0.6 54	0.5 64	
50				1.7 12	1.3 18	1.2 23	1 26	1 30	0.9 33	0.8 44	0.7 53	0.6 61	0.6 68	0.5 80	
60				1.6 16	1.3 23	1.1 28	1 33	1 37	0.9 40	0.7 53	0.7 64	0.6 73	0.6 81	0.5 96	
70			2.2 10	1.5 21	1.3 28	1.1 34	1 39	1 43	0.9 48	0.7 63	0.7 75	0.6 86	0.6 95		
80			2.1 14	1.5 25	1.3 33	1.1 39	1 45	0.9 50	0.9 55	0.7 72	0.7 86	0.6 98			
90			2 18	1.5 29	1.2 37	1.1 45	1 51	0.9 57	0.9 62	0.7 81	0.7 97				
100			1.9 21	1.5 33	1.2 42	1.1 50	1 57	0.9 64	0.9 70	0.7 90					
110			1.9 24	1.4 37	1.2 47	1.1 56	1 63	0.9 70	0.9 77	0.7 100					
120			1.9 27	1.4 41	1.2 52	1.1 61	1 69	0.9 77	0.9 84						
130			1.8 31	1.4 45	1.2 56	1.1 66	1 76	0.9 84	0.9 92						
140			1.8 34	1.4 49	1.2 61	1.1 72	1 82	0.9 90	0.9 99						
150		3.2 10	1.8 37	1.4 53	1.2 66	1.1 77	1 88	0.9 97							
160		3.1 13	1.8 40	1.4 57	1.2 71	1.1 83	1 94								
170		3 15	1.8 43	1.4 61	1.2 75	1.1 88	1 100								
180		3 18	1.8 46	1.4 65	1.2 80	1.1 94									
190		2.9 20	1.8 49	1.4 68	1.2 85	1.1 99									
200		2.9 22	1.8 52	1.4 72	1.2 89										
210		2.9 24	1.8 55	1.4 76	1.2 94										
220		2.9 26	1.7 58	1.4 80	1.2 99										
230		2.8 28	1.7 61	1.4 84											
240		2.8 30	1.7 64	1.4 88											
250		2.8 32	1.7 67	1.4 92											
260		2.8 34	1.7 70	1.4 96											
270		2.8 36	1.7 73	1.4 100											
280		2.7 38	1.7 76												
290		2.7 40	1.7 79												
300		2.7 42	1.7 82												
310		2.7 44	1.7 85												
320		2.7 46	1.7 87												
330		2.7 47	1.7 90												
340		2.7 49	1.7 93												
350		2.7 51	1.7 96												
360		2.6 53	1.7 99												
370		2.6 55													
380		2.6 57													
390		2.6 59													
400		2.6 60													
410		2.6 62													
420		2.6 64													
430		2.6 66													
440		2.6 68													
450		2.6 69													
460		2.6 71													
470		2.6 73													
480	5.5 10	2.6 75													
490	5.5 12	2.6 77													
500	5.4 13	2.6 78													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																													0.6	10
20																													0.6	20
30															1.2	10	1.1	11	0.9	16	0.7	20	0.7	23	0.6	26	0.5	31	0.5	36
40															1.1	14	1.1	16	0.8	22	0.7	27	0.7	31	0.6	35	0.5	42		
50															1.1	18	1	21	0.8	28	0.7	34	0.7	39	0.6	44	0.5	53		
60															1.1	23	1	25	0.8	34	0.7	41	0.7	48	0.6	53	0.5	63		
70															1.1	27	1	30	0.8	40	0.7	48	0.7	56	0.6	62	0.5	74		
80															1.1	31	1	34	0.8	46	0.7	55	0.7	64	0.6	71	0.5	85		
90															1.1	35	1	39	0.8	52	0.7	62	0.7	72	0.6	81	0.5	96		
100					2.4	11	1.8	19	1.5	25	1.3	31	1.2	35	1.1	40	1	44	0.8	58	0.7	70	0.7	80	0.6	90				
110					2.4	13	1.8	22	1.5	28	1.3	34	1.2	39	1.1	44	1	48	0.8	64	0.7	77	0.7	88	0.6	99				
120					2.3	15	1.7	24	1.4	31	1.3	37	1.2	43	1.1	48	1	53	0.8	70	0.7	84	0.7	96						
130					2.3	17	1.7	26	1.4	34	1.3	41	1.1	47	1.1	52	1	57	0.8	76	0.7	91								
140					2.3	19	1.7	29	1.4	37	1.3	44	1.1	50	1.1	56	1	62	0.8	81	0.7	98								
150					2.3	20	1.7	31	1.4	40	1.3	47	1.1	54	1.1	61	1	66	0.8	87										
160					2.3	22	1.7	33	1.4	43	1.3	51	1.1	58	1.1	65	1	71	0.8	93										
170					2.2	24	1.7	36	1.4	45	1.3	54	1.1	62	1.1	69	1	76	0.8	99										
180					2.2	26	1.7	38	1.4	48	1.3	57	1.1	65	1	73	1	80												
190					2.2	28	1.7	40	1.4	51	1.2	61	1.1	69	1	77	1	85												
200		3.8	10		2.2	29	1.7	43	1.4	54	1.2	64	1.1	73	1	81	1	89												
210		3.7	11		2.2	31	1.7	45	1.4	57	1.2	67	1.1	77	1	86	1	94												
220		3.7	12		2.2	33	1.7	47	1.4	60	1.2	71	1.1	81	1	90	1	98												
230		3.7	13		2.2	35	1.7	50	1.4	63	1.2	74	1.1	84	1	94														
240		3.6	14		2.2	36	1.7	52	1.4	65	1.2	77	1.1	88	1	98														
250		3.6	16		2.1	38	1.7	54	1.4	68	1.2	81	1.1	92																
260		3.6	17		2.1	40	1.7	57	1.4	71	1.2	84	1.1	96																
270		3.6	18		2.1	42	1.6	59	1.4	74	1.2	87	1.1	100																
280		3.6	19		2.1	43	1.6	61	1.4	77	1.2	91																		
290		3.5	20		2.1	45	1.6	64	1.4	80	1.2	94																		
300		3.5	21		2.1	47	1.6	66	1.4	82	1.2	97																		
310		3.5	22		2.1	48	1.6	68	1.4	85																				
320		3.5	23		2.1	50	1.6	71	1.4	88																				
330		3.5	24		2.1	52	1.6	73	1.4	91																				
340		3.5	25		2.1	54	1.6	75	1.4	94																				
350		3.4	26		2.1	55	1.6	78	1.4	97																				
360		3.4	27		2.1	57	1.6	80	1.4	100																				
370		3.4	28		2.1	59	1.6	82																						
380		3.4	29		2.1	60	1.6	85																						
390		3.4	30		2.1	62	1.6	87																						
400		3.4	31		2.1	64	1.6	89																						
410		3.4	32		2.1	66	1.6	91																						
420		3.4	34		2.1	67	1.6	94																						
430		3.4	35		2.1	69	1.6	96																						
440		3.4	35		2.1	71	1.6	98																						
450		3.4	37		2.1	72																								
460		3.3	38		2.1	74																								
470		3.3	39		2.1	76																								
480		3.3	40		2.1	78																								
490		3.3	41		2.1	79																								
500		3.3	42		2.1	81																								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															0.5 11
20											0.8 12	0.7 14	0.6 16	0.6 20	0.5 23
30									1.1 10	0.9 15	0.7 19	0.7 22	0.6 26	0.5 31	0.5 35
40							1.3 11	1.2 13	1.1 15	0.9 21	0.7 26	0.7 31	0.6 35	0.5 42	
50						1.4 12	1.2 15	1.1 17	1 20	0.8 27	0.7 33	0.7 39	0.6 44	0.5 52	
60					1.6 11	1.4 16	1.2 19	1.1 22	1 24	0.8 33	0.7 41	0.7 47	0.6 53	0.5 63	
70					1.6 15	1.3 19	1.2 23	1.1 26	1 29	0.8 39	0.7 48	0.7 55	0.6 62	0.5 74	
80				2 12	1.5 18	1.3 23	1.2 27	1.1 30	1 34	0.8 45	0.7 55	0.7 63	0.6 71	0.5 85	
90				1.9 14	1.5 21	1.3 26	1.2 30	1.1 35	1 38	0.8 51	0.7 62	0.7 72	0.6 80	0.5 95	
100				1.8 17	1.5 24	1.3 29	1.2 34	1.1 39	1 43	0.8 57	0.7 69	0.7 80	0.6 89		
110				1.8 20	1.5 27	1.3 33	1.2 38	1.1 43	1 47	0.8 63	0.7 76	0.7 88	0.6 98		
120		2.5 11	1.8 22	1.5 30	1.3 36	1.2 42	1.1 47	1 52	0.8 69	0.7 83	0.7 96				
130		2.4 14	1.8 25	1.5 33	1.3 40	1.2 46	1.1 51	1 57	0.8 75	0.7 90					
140		2.4 16	1.7 27	1.4 36	1.3 43	1.1 50	1.1 56	1 61	0.8 81	0.7 97					
150		2.4 18	1.7 29	1.4 39	1.3 46	1.1 53	1.1 60	1 66	0.8 87						
160		2.3 20	1.7 32	1.4 41	1.3 50	1.1 57	1.1 64	1 70	0.8 93						
170		2.3 22	1.7 34	1.4 44	1.3 53	1.1 61	1.1 68	1 75	0.8 99						
180		2.3 23	1.7 37	1.4 47	1.3 56	1.1 65	1.1 72	1 80							
190		2.3 25	1.7 39	1.4 50	1.3 60	1.1 69	1 77	1 84							
200		2.2 27	1.7 41	1.4 53	1.3 63	1.1 72	1 81	1 89							
210		2.2 29	1.7 44	1.4 56	1.2 66	1.1 76	1 85	1 93							
220		2.2 31	1.7 46	1.4 59	1.2 70	1.1 80	1 89	1 98							
230		2.2 33	1.7 48	1.4 61	1.2 73	1.1 84	1 93								
240		2.2 34	1.7 51	1.4 64	1.2 76	1.1 87	1 98								
250		2.2 36	1.7 53	1.4 67	1.2 80	1.1 91									
260	3.8 11	2.2 38	1.7 55	1.4 70	1.2 83	1.1 95									
270	3.8 12	2.2 40	1.7 58	1.4 73	1.2 86	1.1 99									
280	3.7 13	2.2 41	1.7 60	1.4 76	1.2 90										
290	3.7 15	2.2 43	1.7 62	1.4 79	1.2 93										
300	3.7 16	2.1 45	1.7 65	1.4 82	1.2 96										
310	3.6 17	2.1 47	1.6 67	1.4 84	1.2 100										
320	3.6 18	2.1 48	1.6 69	1.4 87											
330	3.6 19	2.1 50	1.6 72	1.4 90											
340	3.6 21	2.1 52	1.6 74	1.4 93											
350	3.6 22	2.1 54	1.6 76	1.4 96											
360	3.5 23	2.1 55	1.6 79	1.4 99											
370	3.5 24	2.1 57	1.6 81												
380	3.5 25	2.1 59	1.6 83												
390	3.5 26	2.1 61	1.6 86												
400	3.5 27	2.1 62	1.6 88												
410	3.5 29	2.1 64	1.6 90												
420	3.4 30	2.1 66	1.6 93												
430	3.4 31	2.1 67	1.6 95												
440	3.4 32	2.1 69	1.6 97												
450	3.4 33	2.1 71	1.6 100												
460	3.4 34	2.1 73													
470	3.4 35	2.1 74													
480	3.4 36	2.1 76													
490	3.4 37	2.1 78													
500	3.4 38	2.1 80													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															0.5 10
20															0.5 23
30															
40								1.2 11	1.1 14	0.9 14	0.8 18	0.7 22	0.6 25	0.5 30	
50							1.5 10	1.2 16	1.1 19	0.9 20	0.7 26	0.7 30	0.6 34	0.5 41	
60								1.2 17	1.1 21	1 23	0.8 33	0.7 40	0.7 47	0.6 53	0.5 63
70					1.7 12	1.4 18	1.2 22	1.1 25	1 28	0.8 39	0.7 47	0.7 55	0.6 62	0.5 74	
80					1.6 16	1.3 21	1.2 26	1.1 29	1 33	0.8 45	0.7 54	0.7 63	0.6 71	0.5 84	
90				2 12	1.6 19	1.3 25	1.2 29	1.1 34	1 37	0.8 51	0.7 61	0.7 71	0.6 80	0.5 95	
100				1.9 14	1.5 22	1.3 28	1.2 33	1.1 38	1 42	0.8 56	0.7 69	0.7 79	0.6 89		
110				1.9 17	1.5 25	1.3 32	1.2 37	1.1 42	1 47	0.8 63	0.7 76	0.7 87	0.6 98		
120				1.8 20	1.5 28	1.3 35	1.2 41	1.1 46	1 51	0.8 68	0.7 83	0.7 96			
130				1.8 23	1.5 31	1.3 39	1.2 45	1.1 51	1 56	0.8 74	0.7 90				
140			2.5 12	1.8 25	1.5 34	1.3 42	1.2 49	1.1 55	1 60	0.8 80	0.7 97				
150			2.5 14	1.8 28	1.5 37	1.3 45	1.1 52	1.1 59	1 65	0.8 86					
160			2.4 16	1.7 30	1.4 40	1.3 49	1.1 56	1.1 63	1 70	0.8 92					
170			2.4 18	1.7 32	1.4 43	1.3 52	1.1 60	1.1 67	1 74	0.8 98					
180			2.4 20	1.7 35	1.4 46	1.3 55	1.1 64	1.1 72	1 79						
190			2.3 22	1.7 37	1.4 49	1.3 59	1.1 68	1.1 76	1 83						
200			2.3 24	1.7 40	1.4 52	1.3 62	1.1 71	1.1 80	1 88						
210			2.3 26	1.7 42	1.4 55	1.3 66	1.1 75	1 84	1 93						
220			2.3 28	1.7 45	1.4 57	1.2 69	1.1 79	1 88	1 97						
230			2.3 30	1.7 47	1.4 60	1.2 72	1.1 83	1 93							
240			2.2 32	1.7 49	1.4 63	1.2 76	1.1 87	1 97							
250			2.2 34	1.7 52	1.4 66	1.2 79	1.1 90								
260			2.2 36	1.7 54	1.4 69	1.2 82	1.1 94								
270			2.2 37	1.7 56	1.4 72	1.2 86	1.1 98								
280			2.2 39	1.7 59	1.4 75	1.2 89									
290			2.2 41	1.7 61	1.4 78	1.2 92									
300			2.2 43	1.7 63	1.4 81	1.2 96									
310	3.9 10	2.2 45	1.7 66	1.4 83	1.2 99										
320	3.8 11	2.2 46	1.7 68	1.4 86											
330	3.8 13	2.2 48	1.7 70	1.4 89											
340	3.8 14	2.2 50	1.6 73	1.4 92											
350	3.7 16	2.1 52	1.6 75	1.4 95											
360	3.7 17	2.1 53	1.6 77	1.4 98											
370	3.7 18	2.1 55	1.6 80												
380	3.6 20	2.1 57	1.6 82												
390	3.6 21	2.1 59	1.6 85												
400	3.6 22	2.1 61	1.6 87												
410	3.6 23	2.1 62	1.6 89												
420	3.6 25	2.1 64	1.6 92												
430	3.5 26	2.1 66	1.6 94												
440	3.5 27	2.1 67	1.6 96												
450	3.5 28	2.1 69	1.6 98												
460	3.5 29	2.1 71													
470	3.5 31	2.1 73													
480	3.5 32	2.1 74													
490	3.5 33	2.1 76													
500	3.4 34	2.1 78													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40										1 11	0.8 14	0.7 17	0.7 19	0.6 23	0.5 27
50									1.2 10	0.9 15	0.8 19	0.7 23	0.7 26	0.6 31	0.5 36
60						1.6 10	1.4 10	1.3 12	1.2 14	0.9 20	0.8 25	0.7 29	0.7 33	0.6 39	0.5 45
70					1.9 10	1.6 13	1.4 13	1.3 15	1.2 17	0.9 24	0.8 30	0.7 35	0.6 39	0.6 47	0.5 54
80						1.8 12	1.5 15	1.3 19	1.2 21	1.1 24	0.9 33	0.8 40	0.7 47	0.6 53	0.5 64
90						1.8 14	1.5 18	1.3 21	1.2 24	1.1 27	0.9 37	0.8 46	0.7 53	0.6 60	0.5 82
100				2.2 11	1.7 16	1.5 20	1.3 24	1.2 28	1.1 31	0.9 42	0.8 51	0.7 59	0.6 66	0.6 80	0.5 91
110				2.1 13	1.7 18	1.5 23	1.3 27	1.2 31	1.1 34	0.9 46	0.8 56	0.7 65	0.6 73	0.6 88	
120				2.1 14	1.7 20	1.5 25	1.3 30	1.2 34	1.1 37	0.9 50	0.8 61	0.7 71	0.6 80	0.6 96	
130				2.1 16	1.7 22	1.4 28	1.3 32	1.2 37	1.1 41	0.9 55	0.8 67	0.7 77	0.6 87		
140				2.1 18	1.7 24	1.4 30	1.3 35	1.2 40	1.1 44	0.9 59	0.8 72	0.7 83	0.6 94		
150		2.8 10	2 20	1.7 27	1.4 32	1.3 38	1.2 43	1.1 47	0.9 63	0.8 77	0.7 89	0.6 100			
160		2.8 12	2 21	1.6 29	1.4 35	1.3 40	1.2 46	1.1 51	0.9 68	0.8 82	0.7 95				
170		2.7 13	2 23	1.6 31	1.4 37	1.3 43	1.2 49	1.1 54	0.9 72	0.8 88					
180		2.7 14	2 25	1.6 33	1.4 40	1.3 46	1.2 52	1.1 57	0.9 77	0.8 93					
190		2.7 16	2 26	1.6 35	1.4 42	1.3 49	1.2 55	1.1 61	0.9 81	0.8 98					
200		2.7 17	2 28	1.6 37	1.4 44	1.3 51	1.2 58	1.1 64	0.9 85						
210		2.6 18	2 30	1.6 39	1.4 47	1.3 54	1.2 61	1.1 67	0.9 89						
220		2.6 20	2 31	1.6 41	1.4 49	1.3 57	1.2 64	1.1 70	0.9 94						
230		2.6 21	2 33	1.6 43	1.4 51	1.3 59	1.2 67	1.1 74	0.9 98						
240		2.6 22	1.9 35	1.6 45	1.4 54	1.3 62	1.2 70	1.1 77							
250		2.6 23	1.9 36	1.6 47	1.4 56	1.3 65	1.2 73	1.1 80							
260		2.6 25	1.9 38	1.6 49	1.4 59	1.3 68	1.2 76	1.1 84							
270		2.6 26	1.9 39	1.6 51	1.4 61	1.3 70	1.2 79	1.1 87							
280		2.5 27	1.9 41	1.6 53	1.4 63	1.3 73	1.2 82	1.1 90							
290		2.5 28	1.9 43	1.6 55	1.4 66	1.3 76	1.2 85	1.1 94							
300		2.5 29	1.9 44	1.6 57	1.4 68	1.3 78	1.2 88	1.1 97							
310		2.5 31	1.9 46	1.6 59	1.4 70	1.3 81	1.2 91	1.1 100							
320		2.5 32	1.9 48	1.6 61	1.4 73	1.3 84	1.2 94								
330	4.5 10	2.5 33	1.9 49	1.6 63	1.4 75	1.3 87	1.1 97								
340	4.5 10	2.5 34	1.9 51	1.6 65	1.4 78	1.3 89	1.1 100								
350	4.4 11	2.5 35	1.9 52	1.6 67	1.4 80	1.2 92									
360	4.4 12	2.5 37	1.9 54	1.6 69	1.4 82	1.2 95									
370	4.4 13	2.5 38	1.9 56	1.6 71	1.4 85	1.2 97									
380	4.4 13	2.5 39	1.9 57	1.6 73	1.4 87	1.2 100									
390	4.3 14	2.5 40	1.9 59	1.6 75	1.4 89										
400	4.3 15	2.5 41	1.9 61	1.6 77	1.4 92										
410	4.3 16	2.5 43	1.9 62	1.6 79	1.4 94										
420	4.3 16	2.5 44	1.9 64	1.6 81	1.4 96										
430	4.3 17	2.5 45	1.9 65	1.6 83	1.4 99										
440	4.3 18	2.5 46	1.9 67	1.6 85											
450	4.3 19	2.5 47	1.9 69	1.6 87											
460	4.2 19	2.5 48	1.9 70	1.6 89											
470	4.2 20	2.5 49	1.9 72	1.6 91											
480	4.2 21	2.5 51	1.9 73	1.6 93											
490	4.2 21	2.5 52	1.9 75	1.6 95											
500	4.2 22	2.5 53	1.9 77	1.6 97											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40										1 10	0.8 13	0.7 16	0.7 18	0.6 23	0.5 26
50										1 14	0.8 19	0.7 22	0.7 25	0.6 31	0.5 36
60								1.3 11	1.2 13	0.9 19	0.8 24	0.7 28	0.7 32	0.6 39	0.5 45
70								1.3 14	1.2 16	0.9 23	0.8 29	0.7 34	0.6 39	0.6 47	0.5 54
80						1.6 11	1.4 14	1.3 17	1.2 20	0.9 28	0.8 35	0.7 40	0.6 46	0.6 55	0.5 63
90						1.6 14	1.4 17	1.2 20	1.1 23	0.9 32	0.8 40	0.7 46	0.6 52	0.6 63	0.5 73
100					1.9 12	1.5 16	1.4 20	1.2 23	1.1 26	0.9 37	0.8 45	0.7 53	0.6 59	0.6 71	0.5 82
110					1.8 14	1.5 19	1.3 23	1.2 26	1.1 30	0.9 41	0.8 50	0.7 59	0.6 66	0.6 79	0.5 91
120					1.8 16	1.5 21	1.3 26	1.2 30	1.1 33	0.9 45	0.8 56	0.7 65	0.6 73	0.6 87	0.5 100
130				2.2 11	1.7 18	1.5 24	1.3 28	1.2 33	1.1 36	0.9 50	0.8 61	0.7 71	0.6 80		
140				2.2 13	1.7 21	1.5 26	1.3 31	1.2 36	1.1 40	0.9 54	0.8 66	0.7 77	0.6 86		
150				2.1 15	1.7 23	1.5 29	1.3 34	1.2 39	1.1 43	0.9 58	0.8 71	0.7 83	0.6 93		
160				2.1 17	1.7 25	1.4 31	1.3 37	1.2 42	1.1 47	0.9 63	0.8 77	0.7 89	0.6 100		
170				2.1 19	1.7 27	1.4 34	1.3 39	1.2 45	1.1 50	0.9 67	0.8 82	0.7 95			
180				2.1 21	1.7 29	1.4 36	1.3 42	1.2 48	1.1 53	0.9 72	0.8 87				
190			2.9 10	2 22	1.7 31	1.4 38	1.3 45	1.2 51	1.1 57	0.9 76	0.8 92				
200			2.8 12	2 24	1.6 33	1.4 41	1.3 48	1.2 54	1.1 60	0.9 80	0.8 98				
210			2.8 13	2 26	1.6 35	1.4 43	1.3 50	1.2 57	1.1 63	0.9 85					
220			2.7 15	2 28	1.6 37	1.4 46	1.3 53	1.2 60	1.1 66	0.9 89					
230			2.7 16	2 29	1.6 39	1.4 48	1.3 56	1.2 63	1.1 70	0.9 93					
240			2.7 17	2 31	1.6 41	1.4 50	1.3 59	1.2 66	1.1 73	0.9 98					
250			2.7 19	2 33	1.6 43	1.4 53	1.3 61	1.2 69	1.1 76						
260			2.7 20	2 34	1.6 46	1.4 55	1.3 64	1.2 72	1.1 80						
270			2.6 21	2 36	1.6 48	1.4 58	1.3 67	1.2 75	1.1 83						
280			2.6 23	2 38	1.6 50	1.4 60	1.3 69	1.2 78	1.1 86						
290			2.6 24	1.9 39	1.6 52	1.4 62	1.3 72	1.2 81	1.1 90						
300			2.6 25	1.9 41	1.6 54	1.4 65	1.3 75	1.2 84	1.1 93						
310			2.6 27	1.9 43	1.6 56	1.4 67	1.3 78	1.2 87	1.1 96						
320			2.6 28	1.9 44	1.6 58	1.4 69	1.3 80	1.2 90	1.1 100						
330			2.6 29	1.9 46	1.6 60	1.4 72	1.3 83	1.2 93							
340			2.6 30	1.9 48	1.6 62	1.4 74	1.3 86	1.2 96							
350			2.5 32	1.9 49	1.6 64	1.4 77	1.3 88	1.2 99							
360			2.5 33	1.9 51	1.6 66	1.4 79	1.3 91								
370			2.5 34	1.9 53	1.6 68	1.4 81	1.3 94								
380			2.5 35	1.9 54	1.6 70	1.4 84	1.3 96								
390			2.5 37	1.9 56	1.6 72	1.4 86	1.2 99								
400			2.5 38	1.9 57	1.6 74	1.4 89									
410			2.5 39	1.9 59	1.6 76	1.4 91									
420			2.5 40	1.9 61	1.6 78	1.4 93									
430			2.5 41	1.9 62	1.6 80	1.4 96									
440			2.5 43	1.9 64	1.6 82	1.4 98									
450			4.5 10	2.5 44	1.9 66	1.6 84	1.4 100								
460			4.5 11	2.5 45	1.9 67	1.6 86									
470			4.5 12	2.5 46	1.9 69	1.6 88									
480			4.4 13	2.5 47	1.9 70	1.6 90									
490			4.4 14	2.5 49	1.9 72	1.6 92									
500			4.4 15	2.5 50	1.9 74	1.6 94									
510			4.4 16	2.5 51	1.9 75	1.6 96									

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50										1 13	0.8 18	0.7 22	0.7 25	0.6 30	0.5 35
60								1.3 12	1.2 15	0.9 23	0.8 29	0.7 34	0.6 38	0.6 47	0.5 54
70								1.3 16	1.2 18	0.9 27	0.8 34	0.7 40	0.6 45	0.6 55	0.5 63
80						1.7 11	1.4 16	1.3 19	1.2 22	0.9 31	0.8 39	0.7 46	0.6 52	0.6 63	0.5 72
90						1.6 14	1.4 19	1.2 22	1.1 25	0.9 36	0.8 45	0.7 52	0.6 59	0.6 71	0.5 81
100					1.9 11	1.6 17	1.4 21	1.2 25	1.1 29	0.9 40	0.8 50	0.7 58	0.6 66	0.6 79	0.5 91
110						1.5 20	1.3 24	1.2 28	1.1 32	0.9 45	0.8 55	0.7 64	0.6 72	0.6 87	0.5 100
120						1.8 16	1.5 22	1.3 27	1.2 32	1.1 36	0.9 49	0.8 60	0.7 70	0.6 79	
130				2.3 10	1.8 18	1.5 25	1.3 30	1.2 35	1.1 39	0.9 53	0.8 66	0.7 76	0.6 86		
140				2.2 12	1.8 21	1.5 27	1.3 33	1.2 38	1.1 42	0.9 58	0.8 71	0.7 82	0.6 93		
150				2.2 14	1.7 23	1.5 30	1.3 36	1.2 41	1.1 46	0.9 62	0.8 76	0.7 88	0.6 100		
160				2.1 16	1.7 25	1.5 32	1.3 38	1.2 44	1.1 49	0.9 66	0.8 81	0.7 95			
170				2.1 18	1.7 27	1.4 35	1.3 41	1.2 47	1.1 52	0.9 71	0.8 87	0.7 100			
180				2.1 20	1.7 29	1.4 37	1.3 44	1.2 50	1.1 56	0.9 75	0.8 92				
190				2.1 22	1.7 32	1.4 40	1.3 47	1.2 53	1.1 59	0.9 80	0.8 97				
200				2.1 24	1.7 34	1.4 42	1.3 49	1.2 56	1.1 62	0.9 84					
210				2.1 25	1.7 36	1.4 44	1.3 52	1.2 59	1.1 66	0.9 88					
220		2.9 11	2 27	1.6 38	1.4 47	1.3 55	1.2 62	1.1 69	0.9 93						
230		2.8 13	2 29	1.6 40	1.4 49	1.3 58	1.2 65	1.1 72	0.9 97						
240		2.8 14	2 31	1.6 42	1.4 52	1.3 60	1.2 68	1.1 76							
250		2.8 16	2 32	1.6 44	1.4 54	1.3 63	1.2 71	1.1 79							
260		2.7 17	2 34	1.6 46	1.4 56	1.3 66	1.2 74	1.1 82							
270		2.7 19	2 36	1.6 48	1.4 59	1.3 69	1.2 77	1.1 85							
280		2.7 20	2 38	1.6 50	1.4 61	1.3 71	1.2 80	1.1 89							
290		2.7 22	2 39	1.6 52	1.4 64	1.3 74	1.2 83	1.1 92							
300		2.7 23	2 41	1.6 54	1.4 66	1.3 77	1.2 86	1.1 95							
310		2.6 25	2 42	1.6 56	1.4 68	1.3 79	1.2 89	1.1 99							
320		2.6 26	1.9 44	1.6 58	1.4 71	1.3 82	1.2 92								
330		2.6 27	1.9 46	1.6 60	1.4 73	1.3 85	1.2 95								
340		2.6 29	1.9 48	1.6 63	1.4 76	1.3 87	1.2 98								
350		2.6 30	1.9 49	1.6 65	1.4 78	1.3 90									
360		2.6 31	1.9 51	1.6 67	1.4 80	1.3 93									
370		2.6 32	1.9 53	1.6 69	1.4 83	1.3 96									
380		2.6 34	1.9 54	1.6 71	1.4 85	1.3 98									
390		2.6 35	1.9 56	1.6 73	1.4 88										
400		2.5 36	1.9 58	1.6 75	1.4 90										
410		2.5 38	1.9 59	1.6 77	1.4 92										
420		2.5 39	1.9 61	1.6 79	1.4 95										
430		2.5 40	1.9 62	1.6 81	1.4 97										
440		2.5 41	1.9 64	1.6 83	1.4 99										
450		2.5 42	1.9 66	1.6 85											
460		2.5 44	1.9 67	1.6 87											
470		2.5 45	1.9 69	1.6 89											
480		2.5 46	1.9 71	1.6 91											
490		2.5 47	1.9 72	1.6 93											
500		2.5 49	1.9 74	1.6 95											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																										0.6	10	0.6	12	0.5	14
20													1.2	11	1.1	13	1	15	0.8	13	0.7	16	0.7	18	0.6	21	0.6	25			
30													1.1	21	1	24	1	26	0.8	20	0.7	24	0.6	28	0.6	32	0.5	38			
40								1.5	11	1.3	14	1.2	16	1.1	18	1	20	0.8	27	0.7	33	0.6	38	0.6	43	0.6	51	0.5	51		
50						1.8	10	1.4	15	1.3	18	1.1	21	1	24	1	26	0.8	35	0.7	42	0.6	48	0.6	54	0.6	64	0.5	64		
60						1.7	13	1.4	18	1.2	22	1.1	26	1	29	1	32	0.8	42	0.7	50	0.6	58	0.6	65	0.6	76	0.5	76		
70					2.3	10	1.7	17	1.4	22	1.2	26	1.1	30	1	34	1	37	0.8	49	0.7	59	0.6	68	0.6	76	0.6	89	0.5	89	
80					2.2	12	1.6	20	1.4	25	1.2	31	1.1	35	1	39	0.9	43	0.8	56	0.7	68	0.6	77	0.6	86					
90					2.2	15	1.6	23	1.4	29	1.2	35	1.1	40	1	44	0.9	49	0.8	64	0.7	76	0.6	87	0.6	97					
100					2.1	17	1.6	26	1.3	33	1.2	39	1.1	44	1	50	0.9	54	0.8	71	0.7	85	0.6	97							
110					2.1	19	1.6	29	1.3	36	1.2	43	1.1	49	1	55	0.9	60	0.8	78	0.7	93									
120					2.1	21	1.6	32	1.3	40	1.2	47	1.1	54	1	60	0.9	65	0.8	85											
130					2	24	1.6	34	1.3	43	1.2	51	1.1	58	1	65	0.9	71	0.8	93											
140					2	26	1.6	37	1.3	47	1.2	55	1.1	63	1	70	0.9	77	0.8	100											
150		3.4	10	2	28	1.6	40	1.3	51	1.2	60	1.1	68	1	75	0.9	82														
160		3.4	12	2	30	1.5	43	1.3	54	1.2	64	1.1	72	1	80	0.9	88														
170		3.3	13	2	33	1.5	46	1.3	58	1.2	68	1.1	77	1	86	0.9	94														
180		3.3	15	2	35	1.5	49	1.3	61	1.2	72	1.1	82	1	91	0.9	99														
190		3.2	16	2	37	1.5	52	1.3	65	1.2	76	1.1	86	1	96																
200		3.2	18	2	39	1.5	55	1.3	68	1.2	80	1.1	91																		
210		3.2	19	2	41	1.5	58	1.3	72	1.2	84	1.1	96																		
220		3.2	20	1.9	44	1.5	61	1.3	76	1.2	89	1.1	100																		
230		3.1	22	1.9	46	1.5	64	1.3	79	1.2	93																				
240		3.1	23	1.9	48	1.5	67	1.3	83	1.2	97																				
250		3.1	25	1.9	50	1.5	70	1.3	86																						
260		3.1	26	1.9	52	1.5	72	1.3	90																						
270		3.1	27	1.9	55	1.5	75	1.3	93																						
280		3.1	29	1.9	57	1.5	78	1.3	97																						
290		3.1	30	1.9	59	1.5	81																								
300		3.1	31	1.9	61	1.5	84																								
310		3	33	1.9	63	1.5	87																								
320		3	34	1.9	65	1.5	90																								
330		3	35	1.9	68	1.5	93																								
340		3	37	1.9	70	1.5	96																								
350		3	38	1.9	72	1.5	99																								
360		3	39	1.9	74																										
370		3	40	1.9	76																										
380		3	42	1.9	79																										
390		3	43	1.9	81																										
400		3	44	1.9	83																										
410		3	46	1.9	85																										
420		3	47	1.9	87																										
430		3	48	1.9	89																										
440		3	50	1.9	92																										
450	6.3	10	3	51	1.9	94																									
460	6.2	10	3	52	1.9	96																									
470	6.2	11	2.9	53	1.9	98																									
480	6.2	12	2.9	55	1.9	100																									
490	6.2	12	2.9	56																											
500	6.2	13	2.9	57																											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10														0.6 11	0.5 13
20														0.5 25	
30														0.5 37	
40														0.5 50	
50														0.5 63	
60														0.5 76	
70														0.5 89	
80															
90															
100															
110															
120															
130															
140															
150															
160															
170															
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%		
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	
10																													0.6	11	
20																													0.5	24	
30															1.1	10	1	13	0.8	19	0.7	23	0.6	27	0.6	31	0.5	37			
40															1.1	16	1	19	0.8	26	0.7	32	0.6	37	0.6	42	0.5	50			
50										1.6	11	1.3	15	1.2	19	1.1	22	1	24	0.8	33	0.7	41	0.6	47	0.6	53	0.5	63		
60										1.5	15	1.3	20	1.1	24	1	27	1	30	0.8	41	0.7	49	0.6	57	0.6	64	0.5	76		
70						1.8	12	1.4	19	1.2	24	1.1	28	1	32	1	36	0.8	48	0.7	58	0.6	67	0.6	75	0.5	89				
80						1.8	16	1.4	23	1.2	28	1.1	33	1	38	1	42	0.8	55	0.7	67	0.6	77	0.6	86						
90						1.7	19	1.4	26	1.2	33	1.1	38	1	43	0.9	47	0.8	62	0.7	75	0.6	87	0.6	97						
100				2.4	10	1.7	22	1.4	30	1.2	37	1.1	43	1	48	0.9	53	0.8	70	0.7	84	0.6	97								
110				2.3	13	1.6	25	1.4	34	1.2	41	1.1	47	1	53	0.9	59	0.8	77	0.7	93										
120				2.3	16	1.6	28	1.3	38	1.2	45	1.1	52	1	58	0.9	64	0.8	84												
130				2.2	19	1.6	32	1.3	41	1.2	49	1.1	57	1	64	0.9	70	0.8	92												
140				2.2	21	1.6	35	1.3	45	1.2	54	1.1	62	1	69	0.9	75	0.8	99												
150				2.1	24	1.6	38	1.3	48	1.2	58	1.1	66	1	74	0.9	81														
160				2.1	26	1.6	41	1.3	52	1.2	62	1.1	71	1	79	0.9	87														
170				2.1	28	1.6	44	1.3	56	1.2	66	1.1	76	1	84	0.9	92														
180				2	31	1.6	47	1.3	59	1.2	70	1.1	80	1	89	0.9	98														
190				2	33	1.6	50	1.3	63	1.2	75	1.1	85	1	95																
200				2	35	1.5	53	1.3	66	1.2	79	1.1	90	1	100																
210				2	38	1.5	55	1.3	70	1.2	83	1.1	94																		
220				2	40	1.5	59	1.3	74	1.2	87	1.1	99																		
230			3.5	11	2	42	1.5	61	1.3	77	1.2	91																			
240			3.4	13	2	45	1.5	64	1.3	81	1.2	95																			
250			3.4	15	2	47	1.5	67	1.3	84	1.2	99																			
260			3.4	17	2	49	1.5	70	1.3	88																					
270			3.3	18	2	51	1.5	73	1.3	91																					
280			3.3	20	1.9	54	1.5	76	1.3	95																					
290			3.3	22	1.9	56	1.5	79	1.3	99																					
300			3.2	23	1.9	58	1.5	82																							
310			3.2	25	1.9	60	1.5	85																							
320			3.2	26	1.9	62	1.5	88																							
330			3.2	28	1.9	65	1.5	91																							
340			3.1	29	1.9	67	1.5	94																							
350			3.1	31	1.9	69	1.5	97																							
360			3.1	32	1.9	71	1.5	100																							
370			3.1	34	1.9	73																									
380			3.1	35	1.9	76																									
390			3.1	37	1.9	78																									
400			3.1	38	1.9	80																									
410			3.1	39	1.9	82																									
420			3.1	41	1.9	84																									
430			3	42	1.9	87																									
440			3	44	1.9	89																									
450			3	45	1.9	91																									
460			3	46	1.9	93																									
470			3	48	1.9	95																									
480			3	49	1.9	98																									
490			3	50	1.9	100																									
500			3	52																											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10											0.8 10	0.7 12	0.7 14	0.6 17	0.5 20
20											0.8 16	0.7 19	0.6 22	0.6 27	0.5 31
30										0.9 13	0.8 16	0.7 19	0.6 22	0.6 27	0.5 31
40								1.2 11	1.1 13	0.9 18	0.8 23	0.7 26	0.6 30	0.6 36	0.5 41
50						1.5 10	1.3 13	1.2 15	1.1 17	0.9 23	0.8 29	0.7 33	0.6 38	0.6 45	0.5 52
60					1.7 10	1.5 13	1.3 16	1.2 18	1.1 21	0.9 28	0.8 35	0.7 40	0.6 45	0.6 54	0.5 62
70					1.7 13	1.4 16	1.3 19	1.2 22	1.1 25	0.9 33	0.8 41	0.7 47	0.6 53	0.6 63	0.5 73
80				2.1 10	1.7 15	1.4 19	1.3 22	1.1 26	1.1 29	0.9 38	0.8 47	0.7 54	0.6 61	0.6 73	0.5 83
90				2 12	1.6 18	1.4 22	1.2 26	1.1 29	1.1 32	0.9 43	0.7 53	0.7 61	0.6 69	0.6 82	0.5 94
100				2 14	1.6 20	1.4 25	1.2 29	1.1 33	1.1 36	0.9 48	0.7 59	0.7 68	0.6 76	0.6 91	
110				1.9 17	1.6 22	1.4 28	1.2 32	1.1 36	1 40	0.9 53	0.7 65	0.7 75	0.6 84	0.6 100	
120			2.6 10	1.9 19	1.6 25	1.4 30	1.2 35	1.1 40	1 44	0.9 59	0.7 71	0.7 82	0.6 92		
130			2.6 12	1.9 21	1.6 27	1.4 33	1.2 38	1.1 43	1 48	0.9 64	0.7 77	0.7 89	0.6 100		
140			2.5 13	1.9 23	1.5 30	1.4 36	1.2 42	1.1 47	1 52	0.8 69	0.7 83	0.7 96			
150			2.5 15	1.9 24	1.5 32	1.3 39	1.2 45	1.1 50	1 56	0.8 74	0.7 89				
160			2.5 16	1.9 26	1.5 35	1.3 42	1.2 48	1.1 54	1 59	0.8 79	0.7 95				
170			2.5 18	1.8 28	1.5 37	1.3 44	1.2 51	1.1 57	1 63	0.8 84					
180			2.4 19	1.8 30	1.5 39	1.3 47	1.2 54	1.1 61	1 67	0.8 89					
190			2.4 21	1.8 32	1.5 42	1.3 50	1.2 57	1.1 64	1 71	0.8 94					
200			2.4 22	1.8 34	1.5 44	1.3 53	1.2 61	1.1 68	1 75	0.8 99					
210			2.4 24	1.8 36	1.5 46	1.3 55	1.2 64	1.1 71	1 79						
220			2.4 25	1.8 38	1.5 49	1.3 58	1.2 67	1.1 75	1 82						
230			2.4 27	1.8 40	1.5 51	1.3 61	1.2 70	1.1 78	1 86						
240			2.4 28	1.8 42	1.5 54	1.3 64	1.2 73	1.1 82	1 90						
250			2.4 30	1.8 44	1.5 56	1.3 67	1.2 76	1.1 85	1 94						
260	4.1 10	2.4 31	1.8 46	1.5 58	1.3 69	1.2 79	1.1 89	1 98							
270	4.1 11	2.4 33	1.8 48	1.5 61	1.3 72	1.2 83	1.1 92								
280	4.1 11	2.3 34	1.8 50	1.5 63	1.3 75	1.2 86	1.1 96								
290	4 12	2.3 35	1.8 52	1.5 65	1.3 78	1.2 89	1.1 99								
300	4 13	2.3 37	1.8 54	1.5 68	1.3 80	1.2 92									
310	4 14	2.3 38	1.8 55	1.5 70	1.3 83	1.2 95									
320	4 15	2.3 40	1.8 57	1.5 72	1.3 86	1.2 99									
330	4 16	2.3 41	1.8 59	1.5 75	1.3 89										
340	3.9 17	2.3 42	1.8 61	1.5 77	1.3 91										
350	3.9 18	2.3 44	1.8 63	1.5 80	1.3 94										
360	3.9 19	2.3 45	1.8 65	1.5 82	1.3 97										
370	3.9 20	2.3 47	1.8 67	1.5 84	1.3 100										
380	3.9 20	2.3 48	1.8 69	1.5 87											
390	3.9 21	2.3 49	1.8 71	1.5 89											
400	3.8 22	2.3 51	1.8 73	1.5 91											
410	3.8 23	2.3 52	1.8 75	1.5 94											
420	3.8 24	2.3 54	1.8 77	1.5 96											
430	3.8 25	2.3 55	1.8 78	1.5 98											
440	3.8 26	2.3 56	1.8 80												
450	3.8 26	2.3 58	1.8 82												
460	3.8 27	2.3 59	1.8 84												
470	3.8 28	2.3 61	1.7 86												
480	3.8 29	2.3 62	1.7 88												
490	3.8 30	2.3 63	1.7 90												
500	3.8 31	2.3 65	1.7 92												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40								1.3	10	1.2	12	0.9	12	0.8	16
50							1.4	11	1.2	14	1.1	16	0.9	17	0.8
60						1.5	11	1.3	15	1.2	17	1.1	20	0.9	28
70					1.8	10	1.5	15	1.3	18	1.2	21	1.1	24	0.9
80					1.7	13	1.4	18	1.3	21	1.2	25	1.1	28	0.9
90					1.7	16	1.4	20	1.3	25	1.1	28	1.1	32	0.9
100				2.1	12	1.6	18	1.4	23	1.2	28	1.1	32	1.1	35
110				2	14	1.6	21	1.4	26	1.2	31	1.1	35	1.1	39
120				2	16	1.6	23	1.4	29	1.2	34	1.1	39	1	43
130				2	18	1.6	26	1.4	32	1.2	37	1.1	42	1	47
140				1.9	20	1.6	28	1.4	35	1.2	41	1.1	46	1	51
150			2.7	11	1.9	23	1.6	31	1.4	38	1.2	44	1.1	50	1
160			2.6	13	1.9	25	1.6	33	1.3	40	1.2	47	1.1	53	1
170			2.6	15	1.9	27	1.5	36	1.3	43	1.2	50	1.1	56	1
180			2.5	16	1.9	29	1.5	38	1.3	46	1.2	53	1.1	60	1
190			2.5	18	1.9	31	1.5	40	1.3	49	1.2	57	1.1	64	1
200			2.5	19	1.8	33	1.5	43	1.3	52	1.2	60	1.1	67	1
210			2.5	21	1.8	35	1.5	45	1.3	54	1.2	63	1.1	71	1
220			2.5	23	1.8	37	1.5	48	1.3	57	1.2	66	1.1	74	1
230			2.4	24	1.8	38	1.5	50	1.3	60	1.2	69	1.1	78	1
240			2.4	26	1.8	40	1.5	52	1.3	63	1.2	72	1.1	81	1
250			2.4	27	1.8	42	1.5	55	1.3	66	1.2	76	1.1	85	1
260			2.4	29	1.8	44	1.5	57	1.3	68	1.2	79	1.1	88	1
270			2.4	30	1.8	46	1.5	60	1.3	71	1.2	82	1.1	92	1
280			2.4	32	1.8	48	1.5	62	1.3	74	1.2	85	1.1	95	1
290			2.4	33	1.8	50	1.5	64	1.3	77	1.2	88	1.1	99	1
300			2.4	34	1.8	52	1.5	67	1.3	80	1.2	91			
310			2.4	36	1.8	54	1.5	69	1.3	82	1.2	94			
320			2.4	37	1.8	56	1.5	71	1.3	85	1.2	98			
330			2.3	39	1.8	58	1.5	74	1.3	88					
340		4.2	10	2.3	40	1.8	60	1.5	76	1.3	91				
350		4.1	11	2.3	42	1.8	62	1.5	79	1.3	94				
360		4.1	12	2.3	43	1.8	64	1.5	81	1.3	96				
370		4.1	13	2.3	45	1.8	66	1.5	83	1.3	99				
380		4.1	14	2.3	46	1.8	67	1.5	86						
390		4	16	2.3	47	1.8	69	1.5	88						
400		4	16	2.3	49	1.8	71	1.5	90						
410		4	17	2.3	50	1.8	73	1.5	93						
420		4	18	2.3	52	1.8	75	1.5	95						
430		3.9	19	2.3	53	1.8	77	1.5	97						
440		3.9	20	2.3	55	1.8	79	1.5	100						
450		3.9	21	2.3	56	1.8	81								
460		3.9	22	2.3	57	1.8	83								
470		3.9	23	2.3	59	1.8	85								
480		3.9	24	2.3	60	1.8	87								
490		3.9	25	2.3	62	1.8	89								
500		3.8	26	2.3	63	1.8	91								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50										1 11	0.8 15	0.7 11	0.7 13	0.6 16	0.5 19
60										0.9 16	0.8 21	0.7 18	0.6 21	0.6 26	0.5 30
70								1.3 12	1.1 14	0.9 22	0.8 27	0.7 25	0.6 29	0.6 35	0.5 40
80								1.1 19	0.9 27	0.8 33	0.7 39	0.6 44	0.6 54	0.5 62	
90						1.5 13	1.3 16	1.2 20	1.1 23	0.9 32	0.8 40	0.7 46	0.6 52	0.6 63	0.5 72
100						1.8 10	1.3 20	1.2 23	1.1 27	0.9 37	0.8 46	0.7 53	0.6 60	0.6 72	0.5 83
110						1.8 13	1.3 23	1.2 27	1.1 31	0.9 42	0.7 52	0.7 60	0.6 68	0.6 81	0.5 93
120						1.7 16	1.4 22	1.3 27	1.1 31	0.9 47	0.7 58	0.7 67	0.6 76	0.6 90	
130						1.7 19	1.4 25	1.3 30	1.1 34	0.9 52	0.7 64	0.7 74	0.6 83	0.6 100	
140						2.1 11	1.6 22	1.4 28	1.2 33	1.1 38	0.9 57	0.7 70	0.7 81	0.6 91	
150						2 16	1.6 24	1.4 31	1.2 36	1.1 42	1 46	0.9 62	0.7 76	0.6 99	
160						2 18	1.6 27	1.4 34	1.2 40	1.1 45	1 50	0.9 67	0.7 82		
170						2 20	1.6 29	1.4 36	1.2 43	1.1 49	1 54	0.9 72	0.7 88		
180						2 22	1.6 32	1.4 39	1.2 46	1.1 52	1 58	0.8 77	0.7 94		
190						2.7 10	1.9 24	1.6 34	1.4 42	1.2 49	1.1 56	1 62	0.8 82		
200						2.7 12	1.9 27	1.6 37	1.3 45	1.2 52	1.1 59	1 66	0.8 88		
210						2.6 14	1.9 29	1.5 39	1.3 48	1.2 56	1.1 63	1 69	0.8 93		
220						2.6 16	1.9 31	1.5 41	1.3 51	1.2 59	1.1 66	1 73	0.8 98		
230						2.6 17	1.9 33	1.5 44	1.3 53	1.2 62	1.1 70	1 77			
240						2.5 19	1.9 35	1.5 46	1.3 56	1.2 65	1.1 73	1 81			
250						2.5 21	1.8 37	1.5 49	1.3 59	1.2 68	1.1 77	1 85			
260						2.5 22	1.8 39	1.5 51	1.3 62	1.2 71	1.1 80	1 89			
270						2.5 24	1.8 41	1.5 53	1.3 65	1.2 75	1.1 84	1 92			
280						2.5 26	1.8 43	1.5 56	1.3 68	1.2 78	1.1 87	1 96			
290						2.4 27	1.8 45	1.5 58	1.3 70	1.2 81	1.1 91	1 100			
300						2.4 29	1.8 47	1.5 61	1.3 73	1.2 84	1.1 94				
310						2.4 30	1.8 49	1.5 63	1.3 76	1.2 87	1.1 98				
320						2.4 32	1.8 51	1.5 66	1.3 79	1.2 90					
330						2.4 33	1.8 52	1.5 68	1.3 81	1.2 94					
340						2.4 35	1.8 54	1.5 70	1.3 84	1.2 97					
350						2.4 36	1.8 56	1.5 73	1.3 87	1.2 100					
360						2.4 38	1.8 58	1.5 75	1.3 90						
370						2.4 39	1.8 60	1.5 77	1.3 93						
380						2.4 41	1.8 62	1.5 80	1.3 95						
390						2.4 42	1.8 64	1.5 82	1.3 98						
400						2.4 44	1.8 66	1.5 85							
410						2.3 45	1.8 68	1.5 87							
420						2.3 47	1.8 70	1.5 89							
430						2.3 48	1.8 72	1.5 92							
440						4.2 10	2.3 48	1.8 72	1.5 92						
450						4.2 11	2.3 50	1.8 74	1.5 94						
460						4.2 12	2.3 51	1.8 76	1.5 96						
470						4.1 13	2.3 53	1.8 78	1.5 99						
480						4.1 14	2.3 54	1.8 80							
490						4.1 15	2.3 55	1.8 81							
500						4.1 17	2.3 57	1.8 83							
						4 18	2.3 58	1.8 85							
						4 19	2.3 60	1.8 87							
						4 20	2.3 61	1.8 89							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20														0.7 10	0.6 12
30														0.6 16	0.6 19
40										1.1 10	0.9 13	0.8 11	0.7 13	0.6 22	0.6 26
50										1.1 13	0.9 17	0.8 16	0.7 18	0.6 28	0.6 33
60									1.4 11	1 16	0.9 21	0.8 24	0.7 28	0.6 34	0.6 40
70								1.5 11	1.3 13	1 19	0.9 24	0.8 29	0.7 33	0.6 40	0.6 46
80							1.6 11	1.5 13	1.3 15	1 22	0.9 28	0.8 33	0.7 38	0.6 46	0.6 53
90						1.8 10	1.6 13	1.4 16	1.3 18	1 26	0.9 32	0.8 38	0.7 43	0.6 52	0.6 60
100						1.8 12	1.6 15	1.4 18	1.3 20	1 29	0.9 36	0.8 42	0.7 48	0.6 58	0.5 67
110					2.1 10	1.8 14	1.6 17	1.4 20	1.3 23	1 32	0.9 39	0.8 46	0.7 53	0.6 64	0.5 74
120					2.1 11	1.8 15	1.5 19	1.4 22	1.3 25	1 35	0.9 43	0.8 51	0.7 57	0.6 70	0.5 80
130					2.1 13	1.7 17	1.5 21	1.4 24	1.3 27	1 38	0.8 47	0.8 55	0.7 62	0.6 75	0.5 87
140					2 14	1.7 19	1.5 23	1.4 26	1.3 29	1 41	0.8 51	0.8 59	0.7 67	0.6 81	0.5 94
150				2.5 10	2 16	1.7 20	1.5 25	1.4 28	1.2 32	1 44	0.8 54	0.8 64	0.7 72	0.6 87	
160				2.5 11	2 17	1.7 22	1.5 26	1.4 30	1.2 34	1 47	0.8 58	0.8 68	0.7 77	0.6 93	
170				2.5 12	2 19	1.7 24	1.5 28	1.3 33	1.2 36	1 50	0.8 62	0.8 72	0.7 82	0.6 99	
180				2.5 13	2 20	1.7 25	1.5 30	1.3 35	1.2 39	1 53	0.8 66	0.8 77	0.7 87		
190				2.4 15	2 21	1.7 27	1.5 32	1.3 37	1.2 41	1 56	0.8 69	0.8 81	0.7 92		
200				2.4 16	2 23	1.7 29	1.5 34	1.3 39	1.2 43	1 59	0.8 73	0.8 86	0.7 97		
210				2.4 17	1.9 24	1.7 30	1.5 36	1.3 41	1.2 46	1 62	0.8 77	0.8 90			
220				2.4 18	1.9 26	1.7 32	1.5 38	1.3 43	1.2 48	1 66	0.8 81	0.8 94			
230				2.4 19	1.9 27	1.7 34	1.5 40	1.3 45	1.2 50	1 69	0.8 84	0.8 98			
240		3.3 10		2.4 20	1.9 28	1.6 35	1.5 42	1.3 47	1.2 53	1 72	0.8 88				
250		3.3 11		2.4 21	1.9 30	1.6 37	1.5 43	1.3 49	1.2 55	1 75	0.8 92				
260		3.3 11		2.3 23	1.9 31	1.6 38	1.5 45	1.3 51	1.2 57	1 78	0.8 96				
270		3.3 12		2.3 24	1.9 32	1.6 40	1.5 47	1.3 53	1.2 60	1 81	0.8 99				
280		3.3 13		2.3 25	1.9 34	1.6 42	1.5 49	1.3 56	1.2 62	1 84					
290		3.2 14		2.3 26	1.9 35	1.6 43	1.4 51	1.3 58	1.2 64	1 87					
300		3.2 15		2.3 27	1.9 37	1.6 45	1.4 53	1.3 60	1.2 66	1 90					
310		3.2 16		2.3 28	1.9 38	1.6 47	1.4 55	1.3 62	1.2 69	1 93					
320		3.2 17		2.3 29	1.9 39	1.6 48	1.4 56	1.3 64	1.2 71	1 96					
330		3.2 17		2.3 30	1.9 41	1.6 50	1.4 58	1.3 66	1.2 73	1 99					
340		3.2 18		2.3 31	1.9 42	1.6 51	1.4 60	1.3 68	1.2 76						
350		3.2 19		2.3 32	1.9 43	1.6 53	1.4 62	1.3 70	1.2 78						
360		3.1 20		2.3 34	1.9 45	1.6 55	1.4 64	1.3 72	1.2 80						
370		3.1 21		2.3 35	1.9 46	1.6 56	1.4 66	1.3 74	1.2 82						
380		3.1 22		2.3 36	1.9 47	1.6 58	1.4 67	1.3 76	1.2 85						
390		3.1 22		2.3 37	1.9 49	1.6 59	1.4 69	1.3 78	1.2 87						
400		3.1 23		2.3 38	1.9 50	1.6 61	1.4 71	1.3 81	1.2 89						
410		3.1 24		2.3 39	1.9 52	1.6 63	1.4 73	1.3 83	1.2 92						
420		3.1 25		2.3 40	1.9 53	1.6 64	1.4 75	1.3 85	1.2 94						
430		3.1 26		2.3 41	1.9 54	1.6 66	1.4 77	1.3 87	1.2 96						
440		3.1 26		2.3 42	1.9 56	1.6 68	1.4 79	1.3 89	1.2 99						
450		3.1 27		2.3 43	1.9 57	1.6 69	1.4 81	1.3 91							
460		3.1 28		2.3 44	1.9 58	1.6 71	1.4 82	1.3 93							
470		3.1 29		2.3 45	1.9 60	1.6 72	1.4 84	1.3 95							
480		3.1 29		2.3 47	1.9 61	1.6 74	1.4 86	1.3 97							
490		3.1 30		2.2 48	1.9 62	1.6 76	1.4 88	1.3 99							
500			3 31	2.2 49	1.9 64	1.6 77	1.4 90								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20														0.7 10	0.6 12
30														0.6 16	0.6 19
40														0.6 22	0.6 26
50														0.6 28	0.6 32
60														0.6 34	0.6 39
70														0.6 40	0.6 46
80														0.6 46	0.6 53
90														0.6 51	0.6 60
100														0.6 57	0.5 66
110														0.6 63	0.5 73
120														0.6 69	0.5 80
130														0.6 75	0.5 87
140														0.6 81	0.5 93
150														0.6 87	0.5 100
160														0.6 93	
170														0.6 99	
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															0.6 11
20															0.6 18
30													0.8 12	0.6 15	0.6 25
40													0.7 17	0.6 21	0.6 32
50										1.1 10	0.9 15	0.8 19	0.7 22	0.6 27	0.6 39
60										1.1 14	0.9 19	0.8 23	0.7 27	0.6 33	0.6 46
70										1.1 17	0.9 23	0.8 28	0.7 32	0.6 39	0.6 52
80									1.4 12	1 21	0.9 27	0.8 32	0.7 37	0.6 45	0.6 59
90								1.6 12	1.4 15	1 24	0.9 31	0.8 36	0.7 42	0.6 51	0.6 66
100								1.5 14	1.3 17	1 27	0.9 34	0.8 41	0.7 47	0.6 57	0.5 73
110								1.7 13	1.5 17	1 30	0.9 38	0.8 45	0.7 52	0.6 63	0.5 80
120						1.9 10	1.6 15	1.4 19	1.3 22	1 33	0.9 42	0.8 50	0.7 56	0.6 69	0.5 86
130						1.9 12	1.6 17	1.4 21	1.3 25	1 36	0.9 46	0.8 54	0.7 61	0.6 75	0.5 93
140						1.8 14	1.6 19	1.4 24	1.3 27	1 39	0.9 49	0.8 58	0.7 66	0.6 81	0.5 100
150						1.8 16	1.6 21	1.4 26	1.3 30	1 43	0.8 53	0.8 63	0.7 71	0.6 86	
160					2.2 11	1.8 18	1.6 23	1.4 28	1.3 32	1 46	0.8 57	0.8 67	0.7 76	0.6 92	
170					2.1 13	1.8 20	1.5 25	1.4 30	1.3 34	1 49	0.8 61	0.8 71	0.7 81	0.6 98	
180					2.1 15	1.8 22	1.5 27	1.4 32	1.3 37	1 52	0.8 65	0.8 76	0.7 86		
190					2.1 16	1.7 24	1.5 29	1.4 34	1.3 39	1 55	0.8 68	0.8 80	0.7 91		
200					2 18	1.7 25	1.5 31	1.4 37	1.2 41	1 58	0.8 72	0.8 85	0.7 96		
210					2 20	1.7 27	1.5 33	1.4 39	1.2 44	1 61	0.8 76	0.8 89			
220				2.6 10	2 21	1.7 29	1.5 35	1.4 41	1.2 46	1 64	0.8 80	0.8 93			
230				2.6 12	2 23	1.7 30	1.5 37	1.3 43	1.2 48	1 67	0.8 83	0.8 98			
240				2.5 13	2 24	1.7 32	1.5 39	1.3 45	1.2 51	1 70	0.8 87				
250				2.5 15	2 26	1.7 34	1.5 41	1.3 47	1.2 53	1 73	0.8 91				
260				2.5 16	2 27	1.7 36	1.5 43	1.3 49	1.2 55	1 77	0.8 95				
270				2.5 18	2 29	1.7 37	1.5 45	1.3 52	1.2 58	1 80	0.8 98				
280				2.4 19	2 30	1.7 39	1.5 47	1.3 54	1.2 60	1 83					
290				2.4 20	1.9 31	1.7 41	1.5 48	1.3 56	1.2 62	1 86					
300				2.4 21	1.9 33	1.7 42	1.5 50	1.3 58	1.2 65	1 89					
310				2.4 23	1.9 34	1.7 44	1.5 52	1.3 60	1.2 67	1 92					
320				2.4 24	1.9 36	1.7 46	1.5 54	1.3 62	1.2 69	1 95					
330				2.4 25	1.9 37	1.6 47	1.5 56	1.3 64	1.2 72	1 98					
340				2.4 26	1.9 39	1.6 49	1.5 58	1.3 66	1.2 74						
350				2.4 27	1.9 40	1.6 50	1.5 60	1.3 68	1.2 76						
360				2.4 29	1.9 41	1.6 52	1.5 62	1.3 70	1.2 79						
370			3.4 11	2.3 30	1.9 43	1.6 54	1.5 63	1.3 73	1.2 81						
380			3.4 12	2.3 31	1.9 44	1.6 55	1.4 65	1.3 75	1.2 83						
390			3.4 13	2.3 32	1.9 46	1.6 57	1.4 67	1.3 77	1.2 85						
400			3.3 14	2.3 33	1.9 47	1.6 59	1.4 69	1.3 79	1.2 88						
410			3.3 15	2.3 34	1.9 48	1.6 60	1.4 71	1.3 81	1.2 90						
420			3.3 16	2.3 36	1.9 50	1.6 62	1.4 73	1.3 83	1.2 92						
430			3.3 17	2.3 37	1.9 51	1.6 64	1.4 75	1.3 85	1.2 95						
440			3.2 18	2.3 38	1.9 53	1.6 65	1.4 77	1.3 87	1.2 97						
450			3.2 19	2.3 39	1.9 54	1.6 67	1.4 78	1.3 89	1.2 99						
460			3.2 20	2.3 40	1.9 55	1.6 69	1.4 80	1.3 91							
470			3.2 21	2.3 41	1.9 57	1.6 70	1.4 82	1.3 93							
480			3.2 22	2.3 42	1.9 58	1.6 72	1.4 84	1.3 95							
490			3.2 23	2.3 44	1.9 60	1.6 73	1.4 86	1.3 98							
500			3.2 23	2.3 45	1.9 61	1.6 75	1.4 88	1.3 100							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 11	0.6 14
40												0.9 11	0.8 12	0.7 16	0.6 19
50											1 11	0.9 14	0.8 16	0.7 20	0.6 24
60										1.2 10	1 14	0.9 17	0.8 20	0.7 25	0.6 29
70										1.2 13	1 17	0.9 20	0.8 23	0.7 29	0.6 34
80										1.2 15	1 19	0.9 23	0.8 27	0.7 33	0.6 39
90									1.6 11	1.2 17	1 22	0.9 26	0.8 30	0.7 38	0.6 44
100								1.7 10	1.5 12	1.2 19	1 25	0.8 30	0.8 34	0.7 42	0.6 49
110								1.7 12	1.5 14	1.1 21	1 27	0.8 33	0.8 38	0.7 46	0.6 54
120						1.9 11	1.7 13	1.5 16	1.1 24	1 30	0.8 36	0.8 41	0.7 51	0.6 59	
130						1.8 12	1.6 15	1.5 17	1.1 26	1 33	0.8 39	0.8 45	0.7 55	0.6 64	
140						2.1 10	1.8 14	1.6 17	1.5 19	1.1 28	0.9 36	0.8 42	0.8 48	0.7 59	0.6 69
150						2.1 11	1.8 15	1.6 18	1.5 21	1.1 30	0.9 38	0.8 45	0.8 52	0.7 63	0.6 74
160						2.1 13	1.8 16	1.6 20	1.5 22	1.1 32	0.9 41	0.8 49	0.8 55	0.7 68	0.6 79
170						2.1 14	1.8 18	1.6 21	1.5 24	1.1 35	0.9 44	0.8 52	0.8 59	0.7 72	0.6 84
180					2.5 10	2 15	1.8 19	1.6 22	1.5 26	1.1 37	0.9 46	0.8 55	0.8 63	0.7 76	0.6 89
190					2.4 11	2 16	1.8 20	1.6 24	1.4 27	1.1 39	0.9 49	0.8 58	0.8 66	0.7 81	0.6 94
200					2.4 12	2 17	1.8 22	1.6 25	1.4 29	1.1 41	0.9 52	0.8 61	0.8 70	0.7 85	0.6 99
210					2.4 13	2 19	1.8 23	1.6 27	1.4 31	1.1 43	0.9 54	0.8 64	0.8 73	0.7 89	
220					2.4 14	2 20	1.7 24	1.6 28	1.4 32	1.1 46	0.9 57	0.8 67	0.8 77	0.7 94	
230					2.4 15	2 21	1.7 26	1.6 30	1.4 34	1.1 48	0.9 60	0.8 70	0.8 80	0.7 98	
240					2.4 16	2 22	1.7 27	1.6 31	1.4 35	1.1 50	0.9 62	0.8 74	0.8 84		
250				3 10	2.3 17	2 23	1.7 28	1.6 33	1.4 37	1.1 52	0.9 65	0.8 77	0.8 87		
260				3 11	2.3 18	2 24	1.7 29	1.6 34	1.4 39	1.1 54	0.9 68	0.8 80	0.8 91		
270				3 12	2.3 19	2 25	1.7 31	1.6 36	1.4 40	1.1 56	0.9 70	0.8 83	0.8 95		
280				2.9 13	2.3 20	2 26	1.7 32	1.5 37	1.4 42	1.1 59	0.9 73	0.8 86	0.8 98		
290				2.9 13	2.3 21	1.9 28	1.7 33	1.5 39	1.4 43	1.1 61	0.9 76	0.8 89			
300				2.9 14	2.3 22	1.9 29	1.7 35	1.5 40	1.4 45	1.1 63	0.9 79	0.8 92			
310				2.9 15	2.3 23	1.9 30	1.7 36	1.5 41	1.4 47	1.1 65	0.9 81	0.8 96			
320				2.9 16	2.3 24	1.9 31	1.7 37	1.5 43	1.4 48	1.1 67	0.9 84	0.8 99			
330				2.9 17	2.3 25	1.9 32	1.7 38	1.5 44	1.4 50	1.1 70	0.9 86				
340				2.9 17	2.3 26	1.9 33	1.7 40	1.5 46	1.4 51	1.1 72	0.9 89				
350				2.9 18	2.3 27	1.9 34	1.7 41	1.5 47	1.4 53	1.1 74	0.9 92				
360				2.9 19	2.3 28	1.9 35	1.7 42	1.5 49	1.4 55	1.1 76	0.9 95				
370				2.8 20	2.3 29	1.9 36	1.7 44	1.5 50	1.4 56	1.1 78	0.9 97				
380				2.8 20	2.3 30	1.9 38	1.7 45	1.5 51	1.4 58	1.1 80	0.9 100				
390				2.8 21	2.3 31	1.9 39	1.7 46	1.5 53	1.4 59	1.1 83					
400				2.8 22	2.2 31	1.9 40	1.7 47	1.5 54	1.4 61	1.1 85					
410		4 10		2.8 23	2.2 32	1.9 41	1.7 49	1.5 56	1.4 63	1.1 87					
420		4 10		2.8 23	2.2 33	1.9 42	1.7 50	1.5 57	1.4 64	1.1 89					
430		4 11		2.8 24	2.2 34	1.9 43	1.7 51	1.5 59	1.4 66	1.1 91					
440		4 12		2.8 25	2.2 35	1.9 44	1.7 52	1.5 60	1.4 67	1.1 93					
450		4 12		2.8 26	2.2 36	1.9 45	1.7 54	1.5 62	1.4 69	1.1 96					
460		4 13		2.8 26	2.2 37	1.9 46	1.7 55	1.5 63	1.4 71	1.1 98					
470		4 13		2.8 27	2.2 38	1.9 47	1.7 56	1.5 65	1.4 72	1.1 100					
480		4 14		2.8 28	2.2 39	1.9 49	1.7 58	1.5 66	1.4 74						
490		3.9 14		2.8 28	2.2 40	1.9 50	1.7 59	1.5 67	1.4 75						
500		3.9 15		2.8 29	2.2 41	1.9 51	1.7 60	1.5 69	1.4 77						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 11	0.6 13
40														0.7 15	0.6 18
50											1.1 10	0.9 13	0.8 15	0.7 20	0.6 23
60											1 13	0.9 16	0.8 19	0.7 24	0.6 28
70										1.2 11	1 16	0.9 19	0.8 23	0.7 28	0.6 33
80										1.2 13	1 18	0.9 23	0.8 26	0.7 33	0.6 38
90										1.2 16	1 21	0.9 26	0.8 30	0.7 37	0.6 43
100									1.6 10	1.2 18	1 24	0.9 29	0.8 33	0.7 41	0.6 48
110								1.8 10	1.6 12	1.2 20	1 27	0.8 32	0.8 37	0.7 46	0.6 53
120								1.7 11	1.6 14	1.2 23	1 29	0.8 35	0.8 41	0.7 50	0.6 58
130							1.9 10	1.7 13	1.5 16	1.1 25	1 32	0.8 38	0.8 44	0.7 54	0.6 63
140							1.9 11	1.7 15	1.5 18	1.1 27	1 35	0.8 42	0.8 48	0.7 59	0.6 68
150							1.9 13	1.7 16	1.5 19	1.1 29	1 38	0.8 45	0.8 51	0.7 63	0.6 73
160						2.2 10	1.8 14	1.6 18	1.5 21	1.1 32	0.9 40	0.8 48	0.8 55	0.7 67	0.6 79
170						2.1 11	1.8 16	1.6 19	1.5 23	1.1 34	0.9 43	0.8 51	0.8 58	0.7 72	0.6 83
180						2.1 12	1.8 17	1.6 21	1.5 24	1.1 36	0.9 46	0.8 54	0.8 62	0.7 76	0.6 88
190						2.1 14	1.8 18	1.6 22	1.5 26	1.1 38	0.9 48	0.8 57	0.8 66	0.7 80	0.6 93
200						2.1 15	1.8 20	1.6 24	1.5 28	1.1 40	0.9 51	0.8 61	0.8 69	0.7 85	0.6 99
210					2.5 10	2.1 16	1.8 21	1.6 25	1.5 29	1.1 43	0.9 54	0.8 64	0.8 73	0.7 89	
220					2.5 11	2 17	1.8 22	1.6 27	1.5 31	1.1 45	0.9 56	0.8 67	0.8 76	0.7 93	
230					2.5 12	2 19	1.8 24	1.6 28	1.4 33	1.1 47	0.9 59	0.8 70	0.8 80	0.7 98	
240					2.4 13	2 20	1.8 25	1.6 30	1.4 34	1.1 49	0.9 62	0.8 73	0.8 83		
250					2.4 14	2 21	1.8 26	1.6 31	1.4 36	1.1 51	0.9 64	0.8 76	0.8 87		
260					2.4 15	2 22	1.7 28	1.6 33	1.4 37	1.1 53	0.9 67	0.8 79	0.8 91		
270					2.4 16	2 23	1.7 29	1.6 34	1.4 39	1.1 56	0.9 70	0.8 82	0.8 94		
280					2.4 17	2 24	1.7 30	1.6 36	1.4 41	1.1 58	0.9 73	0.8 86	0.8 98		
290					2.4 18	2 26	1.7 32	1.6 37	1.4 42	1.1 60	0.9 75	0.8 89			
300				3.1 10	2.3 19	2 27	1.7 33	1.6 39	1.4 44	1.1 62	0.9 78	0.8 92			
310				3 11	2.3 20	2 28	1.7 34	1.6 40	1.4 46	1.1 64	0.9 81	0.8 95			
320				3 12	2.3 21	2 29	1.7 36	1.6 42	1.4 47	1.1 67	0.9 83	0.8 98			
330				3 12	2.3 22	2 30	1.7 37	1.5 43	1.4 49	1.1 69	0.9 86				
340				3 13	2.3 24	1.9 31	1.7 38	1.5 45	1.4 50	1.1 71	0.9 89				
350				3 14	2.3 24	1.9 33	1.7 40	1.5 46	1.4 52	1.1 73	0.9 91				
360				2.9 15	2.3 25	1.9 34	1.7 41	1.5 48	1.4 54	1.1 75	0.9 94				
370				2.9 16	2.3 26	1.9 35	1.7 42	1.5 49	1.4 55	1.1 77	0.9 97				
380				2.9 17	2.3 27	1.9 36	1.7 43	1.5 50	1.4 57	1.1 80	0.9 99				
390				2.9 18	2.3 28	1.9 37	1.7 45	1.5 52	1.4 58	1.1 82					
400				2.9 18	2.3 29	1.9 38	1.7 46	1.5 53	1.4 60	1.1 84					
410				2.9 19	2.3 30	1.9 39	1.7 47	1.5 55	1.4 62	1.1 86					
420				2.9 20	2.3 31	1.9 40	1.7 49	1.5 56	1.4 63	1.1 88					
430				2.9 21	2.3 32	1.9 42	1.7 50	1.5 58	1.4 65	1.1 90					
440				2.9 22	2.3 33	1.9 43	1.7 51	1.5 59	1.4 66	1.1 93					
450				2.8 22	2.2 34	1.9 44	1.7 53	1.5 60	1.4 68	1.1 95					
460				2.8 23	2.2 35	1.9 45	1.7 54	1.5 62	1.4 70	1.1 97					
470				2.8 24	2.2 36	1.9 46	1.7 55	1.5 63	1.4 71	1.1 99					
480				2.8 25	2.2 37	1.9 47	1.7 56	1.5 65	1.4 73						
490				2.8 25	2.2 38	1.9 48	1.7 58	1.5 66	1.4 74						
500				2.8 26	2.2 39	1.9 49	1.7 59	1.5 68	1.4 76						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 10	0.6 13
40														0.7 15	0.6 18
50												0.9 12	0.8 11	0.7 19	0.6 23
60											1.1 12	0.9 15	0.8 18	0.7 23	0.6 28
70											1 15	0.9 19	0.8 22	0.7 28	0.6 33
80										1.3 12	1 17	0.9 22	0.8 26	0.7 32	0.6 38
90										1.2 14	1 20	0.9 25	0.8 29	0.7 37	0.6 43
100										1.2 17	1 23	0.9 28	0.8 33	0.7 41	0.6 48
110									1.6 10	1.2 19	1 26	0.9 31	0.8 36	0.7 45	0.6 53
120									1.6 12	1.2 21	1 29	0.8 35	0.8 40	0.7 50	0.6 58
130								1.8 10	1.6 14	1.2 24	1 31	0.8 38	0.8 44	0.7 54	0.6 63
140								1.7 12	1.6 16	1.2 26	1 34	0.8 41	0.8 47	0.7 58	0.6 68
150								1.7 14	1.5 17	1.1 28	1 37	0.8 44	0.8 51	0.7 63	0.6 73
160							1.9 11	1.7 16	1.5 19	1.1 31	1 40	0.8 47	0.8 54	0.7 67	0.6 78
170							1.9 13	1.7 17	1.5 21	1.1 33	1 42	0.8 50	0.8 58	0.7 71	0.6 83
180							1.9 14	1.7 19	1.5 23	1.1 35	0.9 45	0.8 54	0.8 62	0.7 76	0.6 88
190						2.2 10	1.9 16	1.6 21	1.5 25	1.1 37	0.9 48	0.8 57	0.8 65	0.7 80	0.6 93
200						2.2 12	1.8 17	1.6 22	1.5 26	1.1 39	0.9 50	0.8 60	0.8 69	0.7 84	0.6 98
210						2.1 13	1.8 19	1.6 24	1.5 28	1.1 42	0.9 53	0.8 63	0.8 72	0.7 88	
220						2.1 14	1.8 20	1.6 25	1.5 30	1.1 44	0.9 56	0.8 66	0.8 76	0.7 93	
230						2.1 16	1.8 22	1.6 27	1.5 31	1.1 46	0.9 58	0.8 69	0.8 79	0.7 97	
240						2.1 17	1.8 23	1.6 28	1.5 33	1.1 48	0.9 61	0.8 73	0.8 83		
250					2.5 10	2.1 18	1.8 25	1.6 30	1.5 34	1.1 50	0.9 64	0.8 76	0.8 86		
260					2.5 11	2 20	1.8 26	1.6 31	1.4 36	1.1 53	0.9 67	0.8 79	0.8 90		
270					2.5 13	2 21	1.8 27	1.6 33	1.4 38	1.1 55	0.9 69	0.8 82	0.8 94		
280					2.5 14	2 22	1.8 29	1.6 34	1.4 40	1.1 57	0.9 72	0.8 85	0.8 97		
290					2.4 15	2 23	1.8 30	1.6 36	1.4 41	1.1 59	0.9 75	0.8 88			
300					2.4 16	2 25	1.7 31	1.6 37	1.4 43	1.1 61	0.9 77	0.8 91			
310					2.4 17	2 26	1.7 33	1.6 39	1.4 44	1.1 64	0.9 80	0.8 95			
320					2.4 18	2 27	1.7 34	1.6 40	1.4 46	1.1 66	0.9 83	0.8 98			
330					2.4 19	2 28	1.7 35	1.6 42	1.4 48	1.1 68	0.9 85				
340					2.4 21	2 29	1.7 37	1.6 43	1.4 49	1.1 70	0.9 88				
350					2.4 22	2 31	1.7 38	1.6 45	1.4 51	1.1 72	0.9 91				
360				3.1 10	2.3 23	2 32	1.7 39	1.6 46	1.4 52	1.1 75	0.9 93				
370				3.1 11	2.3 24	2 33	1.7 41	1.6 48	1.4 54	1.1 77	0.9 96				
380				3 12	2.3 25	2 34	1.7 42	1.5 49	1.4 56	1.1 79	0.9 99				
390				3 13	2.3 26	1.9 35	1.7 43	1.5 51	1.4 57	1.1 81					
400				3 14	2.3 27	1.9 36	1.7 45	1.5 52	1.4 59	1.1 83					
410				3 15	2.3 28	1.9 38	1.7 46	1.5 54	1.4 61	1.1 85					
420				3 16	2.3 29	1.9 39	1.7 47	1.5 55	1.4 62	1.1 88					
430				2.9 16	2.3 30	1.9 40	1.7 48	1.5 56	1.4 64	1.1 90					
440				2.9 17	2.3 31	1.9 41	1.7 50	1.5 58	1.4 65	1.1 92					
450				2.9 18	2.3 32	1.9 42	1.7 51	1.5 59	1.4 67	1.1 94					
460				2.9 19	2.3 33	1.9 43	1.7 52	1.5 61	1.4 69	1.1 96					
470				2.9 20	2.3 34	1.9 44	1.7 54	1.5 62	1.4 70	1.1 98					
480				2.9 21	2.3 35	1.9 45	1.7 55	1.5 64	1.4 72						
490				2.9 22	2.3 36	1.9 47	1.7 56	1.5 65	1.4 73						
500				2.9 23	2.3 37	1.9 48	1.7 58	1.5 67	1.4 75						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																																
20																																
30																				1	10	0.8	13	0.7	15	0.7	17	0.6	21	0.5	24	
40																				1	14	0.8	17	0.7	21	0.7	24	0.6	29	0.5	33	
50																				1	18	0.8	22	0.7	26	0.7	30	0.6	36	0.5	42	
60														1.5	11	1.3	13	1.2	15	0.9	22	0.8	27	0.7	32	0.7	36	0.6	44	0.5	50	
70													1.7	11	1.4	14	1.3	16	1.2	18	0.9	26	0.8	32	0.7	37	0.7	42	0.6	51	0.5	59
80									1.9	10	1.6	13	1.4	16	1.3	19	1.2	22	0.9	30	0.8	37	0.7	43	0.7	49	0.6	58	0.5	67		
90									1.9	12	1.6	16	1.4	19	1.3	22	1.2	25	0.9	34	0.8	42	0.7	48	0.7	55	0.6	66	0.5	76		
100									1.8	14	1.6	18	1.4	22	1.2	25	1.1	28	0.9	38	0.8	46	0.7	54	0.7	61	0.6	73	0.5	84		
110						2.2	10	1.8	16	1.5	20	1.4	24	1.2	27	1.1	31	0.9	42	0.8	51	0.7	60	0.7	67	0.6	81	0.5	93			
120						2.2	12	1.8	18	1.5	22	1.4	27	1.2	30	1.1	34	0.9	46	0.8	56	0.7	65	0.7	73	0.6	88					
130						2.2	14	1.8	20	1.5	25	1.3	29	1.2	33	1.1	37	0.9	50	0.8	61	0.7	71	0.7	80	0.6	96					
140						2.2	15	1.8	22	1.5	27	1.3	31	1.2	36	1.1	40	0.9	54	0.8	66	0.7	76	0.7	86							
150						2.1	17	1.7	23	1.5	29	1.3	34	1.2	39	1.1	43	0.9	58	0.8	70	0.7	82	0.7	92							
160						2.1	18	1.7	25	1.5	31	1.3	36	1.2	41	1.1	46	0.9	62	0.8	75	0.7	87	0.7	98							
170					2.9	10	2.1	20	1.7	27	1.5	33	1.3	39	1.2	44	1.1	49	0.9	66	0.8	80	0.7	93								
180					2.9	12	2.1	21	1.7	29	1.5	36	1.3	41	1.2	47	1.1	52	0.9	70	0.8	85	0.7	98								
190					2.9	13	2.1	23	1.7	31	1.5	38	1.3	44	1.2	50	1.1	55	0.9	74	0.8	90										
200					2.8	14	2.1	24	1.7	33	1.5	40	1.3	46	1.2	52	1.1	58	0.9	78	0.8	94										
210					2.8	15	2.1	26	1.7	34	1.5	42	1.3	49	1.2	55	1.1	61	0.9	82	0.8	99										
220					2.8	16	2.1	27	1.7	36	1.5	44	1.3	51	1.2	58	1.1	64	0.9	86												
230					2.8	17	2.1	29	1.7	38	1.5	46	1.3	54	1.2	60	1.1	67	0.9	89												
240					2.8	19	2	30	1.7	40	1.5	48	1.3	56	1.2	63	1.1	70	0.9	93												
250					2.7	20	2	32	1.7	42	1.5	51	1.3	59	1.2	66	1.1	73	0.9	97												
260					2.7	21	2	33	1.7	44	1.5	53	1.3	61	1.2	69	1.1	76														
270					2.7	22	2	35	1.7	45	1.5	55	1.3	63	1.2	71	1.1	79														
280					2.7	23	2	36	1.7	47	1.4	57	1.3	66	1.2	74	1.1	82														
290					2.7	24	2	38	1.7	49	1.4	59	1.3	68	1.2	77	1.1	85														
300					2.7	25	2	39	1.7	51	1.4	61	1.3	71	1.2	80	1.1	88														
310					2.7	26	2	41	1.7	53	1.4	63	1.3	73	1.2	82	1.1	91														
320					2.7	27	2	42	1.7	55	1.4	66	1.3	76	1.2	85	1.1	94														
330					2.7	29	2	44	1.7	56	1.4	68	1.3	78	1.2	88	1.1	97														
340					2.6	30	2	45	1.7	58	1.4	70	1.3	81	1.2	91	1.1	100														
350					2.6	31	2	47	1.6	60	1.4	72	1.3	83	1.2	93																
360					2.6	32	2	48	1.6	62	1.4	74	1.3	85	1.2	96																
370					2.6	33	2	49	1.6	64	1.4	76	1.3	88	1.2	99																
380					2.6	34	2	51	1.6	65	1.4	78	1.3	90																		
390			4.7	10	2.6	35	2	52	1.6	67	1.4	81	1.3	93																		
400			4.7	11	2.6	36	2	54	1.6	69	1.4	83	1.3	95																		
410			4.7	11	2.6	37	2	55	1.6	71	1.4	85	1.3	98																		
420			4.6	12	2.6	38	2	57	1.6	73	1.4	87	1.3	100																		
430			4.6	13	2.6	39	2	58	1.6	74	1.4	89																				
440			4.6	14	2.6	40	2	60	1.6	76	1.4	91																				
450			4.6	14	2.6	41	2	61	1.6	78	1.4	93																				
460			4.6	15	2.6	42	2	63	1.6	80	1.4	96																				
470			4.6	15	2.6	43	2	64	1.6	82	1.4	98																				
480			4.6	16	2.6	44	2	65	1.6	83	1.4	100																				
490			4.5	17	2.6	46	2	67	1.6	85																						
500			4.5	17	2.6	47	2	68	1.6	87																						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50										1 13	0.9 12	0.8 14	0.7 17	0.6 21	0.5 24
60										1 17	0.8 17	0.7 20	0.7 23	0.6 28	0.5 33
70								1.4 12	1.2 14	0.9 21	0.8 27	0.7 31	0.7 36	0.6 43	0.5 50
80						1.7 11	1.5 15	1.3 18	1.2 17	0.9 25	0.8 31	0.7 37	0.7 42	0.6 51	0.5 58
90						1.6 14	1.4 18	1.3 21	1.2 24	0.9 33	0.8 41	0.7 48	0.7 54	0.6 65	0.5 75
100					1.9 11	1.6 16	1.4 20	1.3 24	1.2 27	0.9 37	0.8 46	0.7 54	0.7 61	0.6 73	0.5 84
110					1.9 14	1.6 19	1.4 23	1.3 26	1.2 30	0.9 41	0.8 51	0.7 59	0.7 67	0.6 80	0.5 92
120					1.9 16	1.6 21	1.4 25	1.2 29	1.1 33	0.9 45	0.8 56	0.7 65	0.7 73	0.6 88	
130			2.3 10	1.8 18	1.5 23	1.4 28	1.2 32	1.1 36	0.9 49	0.8 60	0.7 70	0.7 79	0.7 85		
140			2.3 12	1.8 20	1.5 25	1.4 30	1.2 35	1.1 39	0.9 53	0.8 65	0.7 76	0.7 85			
150			2.2 14	1.8 22	1.5 28	1.3 33	1.2 38	1.1 42	0.9 57	0.8 70	0.7 81	0.7 92			
160			2.2 16	1.8 23	1.5 30	1.3 35	1.2 40	1.1 45	0.9 61	0.8 75	0.7 87	0.7 98			
170			2.2 17	1.8 25	1.5 32	1.3 38	1.2 43	1.1 48	0.9 65	0.8 80	0.7 93				
180			2.2 19	1.7 27	1.5 34	1.3 40	1.2 46	1.1 51	0.9 69	0.8 84	0.7 98				
190			2.1 21	1.7 29	1.5 36	1.3 43	1.2 49	1.1 54	0.9 73	0.8 89					
200			2.1 22	1.7 31	1.5 39	1.3 45	1.2 51	1.1 57	0.9 77	0.8 94					
210			3 11	2.1 24	1.7 33	1.5 41	1.3 48	1.2 54	1.1 60	0.9 81	0.8 99				
220			2.9 12	2.1 25	1.7 35	1.5 43	1.3 50	1.2 57	1.1 63	0.9 85					
230			2.9 13	2.1 27	1.7 37	1.5 45	1.3 53	1.2 60	1.1 66	0.9 89					
240			2.9 15	2.1 28	1.7 39	1.5 47	1.3 55	1.2 62	1.1 69	0.9 93					
250			2.8 16	2.1 30	1.7 40	1.5 49	1.3 58	1.2 65	1.1 72	0.9 97					
260			2.8 17	2.1 31	1.7 42	1.5 52	1.3 60	1.2 68	1.1 75						
270			2.8 18	2.1 33	1.7 44	1.5 54	1.3 62	1.2 71	1.1 78						
280			2.8 20	2 34	1.7 46	1.5 56	1.3 65	1.2 73	1.1 81						
290			2.8 21	2 36	1.7 48	1.5 58	1.3 67	1.2 76	1.1 84						
300			2.7 22	2 37	1.7 50	1.5 60	1.3 70	1.2 79	1.1 87						
310			2.7 23	2 39	1.7 51	1.4 62	1.3 72	1.2 82	1.1 90						
320			2.7 24	2 40	1.7 53	1.4 64	1.3 75	1.2 84	1.1 93						
330			2.7 26	2 42	1.7 55	1.4 67	1.3 77	1.2 87	1.1 96						
340			2.7 27	2 43	1.7 57	1.4 69	1.3 80	1.2 90	1.1 99						
350			2.7 28	2 45	1.7 59	1.4 71	1.3 82	1.2 93							
360			2.7 29	2 46	1.7 61	1.4 73	1.3 85	1.2 95							
370			2.7 30	2 48	1.7 62	1.4 75	1.3 87	1.2 98							
380			2.7 31	2 49	1.7 64	1.4 77	1.3 89								
390			2.7 32	2 51	1.7 66	1.4 80	1.3 92								
400			2.7 33	2 52	1.6 68	1.4 82	1.3 94								
410			2.6 34	2 54	1.6 70	1.4 84	1.3 97								
420			2.6 36	2 55	1.6 71	1.4 86	1.3 99								
430			2.6 37	2 57	1.6 73	1.4 88									
440			2.6 38	2 58	1.6 75	1.4 90									
450			2.6 39	2 60	1.6 77	1.4 92									
460			2.6 40	2 61	1.6 79	1.4 95									
470			2.6 41	2 63	1.6 81	1.4 97									
480			2.6 42	2 64	1.6 82	1.4 99									
490			2.6 43	2 65	1.6 84										
500		4.7 10	2.6 44	2 67	1.6 86										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%			
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)		
10																													0.6	13	0.5	15
20																													0.6	20	0.5	24
30																													0.6	28	0.5	32
40																				1	12	0.8	16	0.7	19	0.7	22	0.6	35	0.5	41	
50																				1	16	0.8	21	0.7	25	0.7	29	0.6	43	0.5	49	
60																				1	20	0.8	26	0.7	31	0.7	35	0.6	50	0.5	58	
70														1.6	10	1.4	13	1.2	16	0.9	24	0.8	31	0.7	36	0.7	41	0.6	58	0.5	66	
80														1.5	13	1.3	16	1.2	19	0.9	28	0.8	36	0.7	42	0.7	48	0.6	65	0.5	75	
90												1.7	11	1.5	16	1.3	19	1.2	22	0.9	32	0.8	40	0.7	47	0.7	54	0.6	73	0.5	84	
100												1.7	14	1.4	18	1.3	22	1.2	26	0.9	36	0.8	45	0.7	53	0.7	60	0.6	80	0.5	92	
110							2	11	1.6	17	1.4	21	1.3	25	1.2	29	0.9	40	0.8	50	0.7	59	0.7	66	0.6	77	0.6	87				
120									1.9	13	1.6	19	1.4	24	1.3	28	1.2	32	0.9	44	0.8	55	0.7	64	0.7	73	0.6	87				
130									1.9	15	1.6	21	1.4	26	1.2	31	1.1	35	0.9	48	0.8	60	0.7	70	0.7	79	0.6	95				
140									1.9	17	1.6	24	1.4	29	1.2	34	1.1	38	0.9	52	0.8	65	0.7	75	0.7	85						
150						2.3	10	1.8	19	1.5	26	1.4	32	1.2	36	1.1	41	0.9	56	0.8	69	0.7	81	0.7	91							
160						2.3	12	1.8	21	1.5	28	1.4	34	1.2	39	1.1	44	0.9	60	0.8	74	0.7	86	0.7	98							
170						2.3	14	1.8	23	1.5	31	1.3	37	1.2	42	1.1	47	0.9	64	0.8	79	0.7	92									
180						2.2	16	1.8	25	1.5	33	1.3	39	1.2	45	1.1	50	0.9	68	0.8	84	0.7	98									
190						2.2	18	1.8	27	1.5	35	1.3	42	1.2	48	1.1	53	0.9	72	0.8	89											
200						2.2	19	1.8	29	1.5	37	1.3	44	1.2	50	1.1	56	0.9	76	0.8	94											
210						2.2	21	1.7	31	1.5	39	1.3	47	1.2	53	1.1	59	0.9	80	0.8	98											
220						2.1	23	1.7	33	1.5	42	1.3	49	1.2	56	1.1	62	0.9	84													
230						2.1	24	1.7	35	1.5	44	1.3	52	1.2	59	1.1	65	0.9	88													
240						2.1	26	1.7	37	1.5	46	1.3	54	1.2	62	1.1	68	0.9	92													
250			3	11	2.1	28	1.7	39	1.5	48	1.3	57	1.2	64	1.1	71	0.9	96														
260			3	12	2.1	29	1.7	41	1.5	50	1.3	59	1.2	67	1.1	74	0.9	100														
270			2.9	14	2.1	31	1.7	43	1.5	53	1.3	62	1.2	70	1.1	77																
280			2.9	15	2.1	32	1.7	44	1.5	55	1.3	64	1.2	72	1.1	80																
290			2.9	17	2.1	34	1.7	46	1.5	57	1.3	66	1.2	75	1.1	84																
300			2.8	18	2.1	35	1.7	48	1.5	59	1.3	69	1.2	78	1.1	86																
310			2.8	19	2.1	37	1.7	50	1.5	61	1.3	71	1.2	81	1.1	90																
320			2.8	21	2.1	38	1.7	52	1.5	63	1.3	74	1.2	83	1.1	92																
330			2.8	22	2	40	1.7	54	1.5	66	1.3	76	1.2	86	1.1	96																
340			2.8	23	2	42	1.7	56	1.4	68	1.3	79	1.2	89	1.1	99																
350			2.8	24	2	43	1.7	57	1.4	70	1.3	81	1.2	92																		
360			2.7	26	2	45	1.7	59	1.4	72	1.3	84	1.2	94																		
370			2.7	27	2	46	1.7	61	1.4	74	1.3	86	1.2	97																		
380			2.7	28	2	48	1.7	63	1.4	76	1.3	89	1.2	100																		
390			2.7	29	2	49	1.7	65	1.4	79	1.3	91																				
400			2.7	30	2	50	1.7	67	1.4	81	1.3	93																				
410			2.7	31	2	52	1.7	68	1.4	83	1.3	96																				
420			2.7	33	2	54	1.7	70	1.4	85	1.3	99																				
430			2.7	34	2	55	1.7	72	1.4	87																						
440			2.7	35	2	57	1.7	74	1.4	89																						
450			2.7	36	2	58	1.6	76	1.4	91																						
460			2.7	37	2	59	1.6	78	1.4	94																						
470			2.7	38	2	61	1.6	79	1.4	96																						
480			2.6	39	2	62	1.6	81	1.4	98																						
490			2.6	41	2	64	1.6	83	1.4	100																						
500			2.6	42	2	65	1.6	85																								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															0.6 11
20															0.6 17
30													0.8 11	0.7 14	0.6 19
40											1 11	0.8 13	0.8 16	0.6 25	0.6 23
50										1.1 11	0.9 14	0.8 17	0.7 20	0.6 30	0.6 29
60										1.1 13	0.9 18	0.8 21	0.7 24	0.6 35	0.6 35
70									1.5 10	1.1 16	0.9 21	0.8 25	0.7 28	0.6 41	0.6 41
80								1.6 11	1.4 13	1.1 19	0.9 24	0.8 29	0.7 33	0.6 47	0.6 47
90							1.7 10	1.6 13	1.4 15	1.1 22	0.9 27	0.8 33	0.7 37	0.6 53	0.6 53
100							1.7 12	1.5 14	1.4 17	1.1 24	0.9 31	0.8 36	0.7 41	0.6 58	0.6 58
110						1.9 10	1.7 14	1.5 16	1.4 19	1.1 27	0.9 34	0.8 40	0.7 46	0.6 64	0.6 64
120						1.9 12	1.7 15	1.5 18	1.4 21	1 30	0.9 37	0.8 44	0.7 50	0.6 70	0.6 70
130						1.9 13	1.7 17	1.5 20	1.3 23	1 32	0.9 41	0.8 48	0.7 54	0.6 76	0.6 76
140					2.2 11	1.9 15	1.6 19	1.5 22	1.3 25	1 35	0.9 44	0.8 52	0.7 59	0.6 82	0.6 82
150					2.2 12	1.9 16	1.6 20	1.5 24	1.3 27	1 38	0.9 47	0.8 55	0.7 63	0.6 88	0.6 88
160					2.2 13	1.8 18	1.6 22	1.5 25	1.3 29	1 40	0.9 50	0.8 59	0.7 67	0.6 94	0.6 94
170					2.2 14	1.8 19	1.6 23	1.4 27	1.3 31	1 43	0.9 54	0.8 63	0.7 71	0.6 87	0.6 100
180					2.1 16	1.8 21	1.6 25	1.4 29	1.3 33	1 46	0.9 57	0.8 67	0.7 76	0.6 92	
190				2.7 10	2.1 17	1.8 22	1.6 27	1.4 31	1.3 35	1 48	0.9 60	0.8 71	0.7 80	0.6 97	
200				2.7 11	2.1 18	1.8 24	1.6 28	1.4 33	1.3 37	1 51	0.9 63	0.8 74	0.7 84		
210				2.7 12	2.1 19	1.8 25	1.6 30	1.4 35	1.3 39	1 54	0.9 67	0.8 78	0.7 89		
220				2.6 14	2.1 21	1.8 26	1.6 32	1.4 36	1.3 41	1 56	0.9 70	0.8 82	0.7 93		
230				2.6 14	2.1 22	1.8 28	1.6 33	1.4 38	1.3 43	1 59	0.9 73	0.8 86	0.7 97		
240				2.6 15	2.1 23	1.8 29	1.6 35	1.4 40	1.3 45	1 62	0.9 76	0.8 89			
250				2.6 16	2.1 24	1.8 31	1.6 36	1.4 42	1.3 47	1 64	0.9 80	0.8 93			
260				2.6 17	2.1 25	1.8 32	1.6 38	1.4 43	1.3 49	1 67	0.9 83	0.8 97			
270				2.6 18	2.1 26	1.8 33	1.6 40	1.4 45	1.3 51	1 70	0.9 86				
280				2.6 19	2.1 28	1.8 35	1.6 41	1.4 47	1.3 53	1 72	0.9 89				
290				2.5 20	2 29	1.8 36	1.6 43	1.4 49	1.3 55	1 75	0.9 93				
300		3.6 10		2.5 21	2 30	1.8 37	1.5 44	1.4 51	1.3 57	1 78	0.9 96				
310		3.6 11		2.5 22	2 31	1.8 39	1.5 46	1.4 52	1.3 59	1 80	0.9 99				
320		3.6 11		2.5 23	2 32	1.7 40	1.5 47	1.4 54	1.3 60	1 83					
330		3.6 12		2.5 24	2 33	1.7 42	1.5 49	1.4 56	1.3 62	1 86					
340		3.5 13		2.5 25	2 35	1.7 43	1.5 51	1.4 58	1.3 64	1 88					
350		3.5 13		2.5 26	2 36	1.7 44	1.5 52	1.4 60	1.3 66	1 91					
360		3.5 14		2.5 27	2 37	1.7 46	1.5 54	1.4 61	1.3 68	1 94					
370		3.5 15		2.5 28	2 38	1.7 47	1.5 55	1.4 63	1.3 70	1 96					
380		3.5 16		2.5 29	2 39	1.7 49	1.5 57	1.4 65	1.3 72	1 99					
390		3.5 16		2.5 30	2 40	1.7 50	1.5 59	1.4 67	1.3 74						
400		3.5 17		2.5 31	2 42	1.7 51	1.5 60	1.4 69	1.3 76						
410		3.4 18		2.5 31	2 43	1.7 53	1.5 62	1.4 70	1.3 78						
420		3.4 18		2.5 32	2 44	1.7 54	1.5 63	1.4 72	1.3 80						
430		3.4 19		2.5 33	2 45	1.7 55	1.5 65	1.4 74	1.3 82						
440		3.4 20		2.5 34	2 46	1.7 57	1.5 66	1.4 76	1.3 84						
450		3.4 20		2.5 35	2 47	1.7 58	1.5 68	1.4 77	1.3 86						
460		3.4 21		2.5 36	2 48	1.7 59	1.5 70	1.4 79	1.3 88						
470		3.4 22		2.5 37	2 50	1.7 61	1.5 71	1.4 81	1.3 90						
480		3.4 22		2.4 38	2 51	1.7 62	1.5 73	1.4 83	1.3 92						
490		3.4 23		2.4 39	2 52	1.7 64	1.5 74	1.4 85	1.3 94						
500		3.4 24		2.4 40	2 53	1.7 65	1.5 76	1.4 86	1.3 96						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															0.6 10
20															0.6 16
30													0.8 10	0.7 14	0.6 16
40													0.8 15	0.6 19	0.6 22
50											1 10	0.9 13	0.8 16	0.7 19	0.6 24
60											1 13	0.8 16	0.8 20	0.6 24	0.6 28
70										1.1 12	0.9 17	0.8 20	0.7 24	0.6 29	0.6 34
80										1.1 15	0.9 20	0.8 24	0.7 28	0.6 34	0.6 40
90									1.5 11	1.1 18	0.9 23	0.8 28	0.7 32	0.6 40	0.6 46
100								1.6 10	1.5 13	1.1 21	0.9 27	0.8 32	0.7 37	0.6 45	0.6 52
110								1.6 13	1.4 15	1.1 23	0.9 30	0.8 36	0.7 41	0.6 50	0.6 58
120							1.7 11	1.6 15	1.4 17	1.1 26	0.9 33	0.8 40	0.7 45	0.6 55	0.6 64
130						2 11	1.7 13	1.5 17	1.4 19	1.1 29	0.9 37	0.8 43	0.7 50	0.6 60	0.6 70
140						1.9 12	1.7 15	1.5 18	1.4 21	1.1 32	0.9 40	0.8 47	0.7 54	0.6 66	0.6 76
150						1.9 14	1.7 17	1.5 20	1.4 24	1 34	0.9 43	0.8 51	0.7 58	0.6 71	0.6 82
160					2.3 10	1.9 16	1.7 18	1.5 22	1.4 26	1 37	0.9 46	0.8 55	0.7 62	0.6 76	0.6 88
170					2.3 11	1.9 17	1.7 20	1.5 24	1.3 28	1 40	0.9 50	0.8 59	0.7 67	0.6 81	0.6 94
180					2.2 13	1.9 19	1.6 22	1.5 26	1.3 30	1 42	0.9 53	0.8 62	0.7 71	0.6 86	0.6 100
190					2.2 14	1.8 20	1.6 24	1.5 28	1.3 32	1 45	0.9 56	0.8 66	0.7 75	0.6 91	
200					2.2 15	1.8 22	1.6 25	1.5 30	1.3 34	1 48	0.9 59	0.8 70	0.7 80	0.6 97	
210					2.2 17	1.8 23	1.6 27	1.4 31	1.3 36	1 50	0.9 63	0.8 74	0.7 84		
220					2.1 18	1.8 25	1.6 29	1.4 33	1.3 38	1 53	0.9 66	0.8 78	0.7 88		
230				2.8 10	2.1 19	1.8 26	1.6 30	1.4 35	1.3 40	1 56	0.9 69	0.8 81	0.7 92		
240				2.7 12	2.1 21	1.8 27	1.6 32	1.4 37	1.3 42	1 58	0.9 73	0.8 85	0.7 97		
250				2.7 13	2.1 22	1.8 29	1.6 33	1.4 39	1.3 44	1 61	0.9 76	0.8 89			
260				2.7 14	2.1 23	1.8 30	1.6 35	1.4 41	1.3 46	1 64	0.9 79	0.8 93			
270				2.7 15	2.1 24	1.8 32	1.6 37	1.4 42	1.3 48	1 66	0.9 82	0.8 97			
280				2.6 16	2.1 25	1.8 33	1.6 38	1.4 44	1.3 50	1 69	0.9 85	0.8 100			
290				2.6 17	2.1 27	1.8 35	1.6 40	1.4 46	1.3 52	1 72	0.9 89				
300				2.6 18	2.1 28	1.8 36	1.6 41	1.4 48	1.3 54	1 74	0.9 92				
310				2.6 19	2.1 29	1.8 37	1.6 43	1.4 50	1.3 56	1 77	0.9 95				
320				2.6 20	2.1 30	1.8 39	1.6 44	1.4 51	1.3 58	1 80	0.9 99				
330				2.6 21	2.1 32	1.8 40	1.6 45	1.4 53	1.3 60	1 82					
340				2.6 22	2 33	1.8 42	1.6 46	1.4 55	1.3 62	1 85					
350				2.6 23	2 34	1.8 43	1.6 48	1.4 57	1.3 64	1 88					
360				2.5 24	2 35	1.8 44	1.5 51	1.4 59	1.3 66	1 90					
370				2.5 25	2 36	1.7 46	1.5 53	1.4 60	1.3 68	1 93					
380		3.6 10		2.5 26	2 37	1.7 47	1.5 54	1.4 62	1.3 70	1 96					
390		3.6 11		2.5 27	2 39	1.7 49	1.5 56	1.4 64	1.3 71	1 98					
400		3.6 12		2.5 28	2 40	1.7 50	1.5 57	1.4 66	1.3 73						
410		3.6 12		2.5 29	2 41	1.7 51	1.5 59	1.4 68	1.3 76						
420		3.6 13		2.5 30	2 42	1.7 53	1.5 61	1.4 69	1.3 77						
430		3.5 14		2.5 31	2 43	1.7 54	1.5 62	1.4 71	1.3 79						
440		3.5 15		2.5 32	2 45	1.7 56	1.5 64	1.4 73	1.3 81						
450		3.5 16		2.5 33	2 46	1.7 57	1.5 65	1.4 75	1.3 83						
460		3.5 16		2.5 34	2 47	1.7 58	1.5 67	1.4 76	1.3 85						
470		3.5 17		2.5 35	2 48	1.7 60	1.5 69	1.4 78	1.3 87						
480		3.5 18		2.5 36	2 49	1.7 61	1.5 70	1.4 80	1.3 89						
490		3.5 19		2.5 37	2 50	1.7 62	1.5 72	1.4 82	1.3 91						
500			3.5 19	2.5 38	2 51	1.7 64	1.5 73	1.4 84	1.3 93						
							1.5 75	1.4 85	1.3 95						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 13	0.6 16
40														0.7 18	0.6 22
50											1 12	0.8 16	0.8 19	0.6 24	0.6 28
60										1.2 11	1 16	0.8 20	0.7 23	0.6 29	0.6 34
70										1.1 14	0.9 19	0.8 23	0.7 27	0.6 34	0.6 40
80										1.1 17	0.9 23	0.8 27	0.7 32	0.6 39	0.6 46
90									1.5 11	1.1 20	0.9 26	0.8 31	0.7 36	0.6 44	0.6 52
100								1.6 10	1.5 13	1.1 22	0.9 29	0.8 35	0.7 40	0.6 50	0.6 58
110								1.6 12	1.5 16	1.1 25	0.9 33	0.8 39	0.7 45	0.6 55	0.6 64
120							1.8 11	1.6 15	1.4 18	1.1 28	0.9 36	0.8 43	0.7 49	0.6 60	0.6 70
130							1.8 13	1.6 17	1.4 20	1.1 31	0.9 39	0.8 47	0.7 53	0.6 65	0.6 76
140							1.7 14	1.5 19	1.4 22	1.1 33	0.9 42	0.8 50	0.7 58	0.6 70	0.6 82
150						2 11	1.7 16	1.5 21	1.4 24	1.1 36	0.9 46	0.8 54	0.7 62	0.6 76	0.6 88
160						2 13	1.7 18	1.5 23	1.4 26	1 39	0.9 49	0.8 58	0.7 66	0.6 81	0.6 94
170						1.9 14	1.7 20	1.5 24	1.4 28	1 41	0.9 52	0.8 62	0.7 70	0.6 86	0.6 100
180						1.9 16	1.7 22	1.5 26	1.3 30	1 44	0.9 56	0.8 66	0.7 75	0.6 91	
190					2.3 10	1.9 18	1.7 23	1.5 28	1.3 32	1 47	0.9 59	0.8 69	0.7 79	0.6 96	
200					2.3 12	1.9 19	1.6 25	1.5 30	1.3 35	1 50	0.9 62	0.8 73	0.7 83		
210					2.2 13	1.9 21	1.6 27	1.5 32	1.3 37	1 52	0.9 65	0.8 77	0.7 88		
220					2.2 15	1.9 22	1.6 28	1.5 34	1.3 39	1 55	0.9 69	0.8 81	0.7 92		
230					2.2 16	1.8 24	1.6 30	1.4 36	1.3 41	1 58	0.9 72	0.8 85	0.7 96		
240					2.2 18	1.8 26	1.6 32	1.4 37	1.3 43	1 60	0.9 75	0.8 88	0.7 100		
250					2.2 19	1.8 27	1.6 34	1.4 39	1.3 45	1 63	0.9 78	0.8 92			
260					2.2 20	1.8 28	1.6 35	1.4 41	1.3 47	1 66	0.9 82	0.8 96			
270				2.8 10	2.1 22	1.8 30	1.6 37	1.4 43	1.3 49	1 68	0.9 85	0.8 100			
280				2.8 11	2.1 23	1.8 31	1.6 38	1.4 45	1.3 51	1 71	0.9 88				
290				2.7 13	2.1 24	1.8 33	1.6 40	1.4 47	1.3 53	1 74	0.9 92				
300				2.7 14	2.1 26	1.8 34	1.6 42	1.4 48	1.3 55	1 76	0.9 95				
310				2.7 15	2.1 27	1.8 36	1.6 43	1.4 50	1.3 57	1 79	0.9 98				
320				2.7 16	2.1 28	1.8 37	1.6 45	1.4 52	1.3 59	1 82					
330				2.6 17	2.1 29	1.8 39	1.6 47	1.4 54	1.3 61	1 84					
340				2.6 19	2.1 31	1.8 40	1.6 48	1.4 56	1.3 63	1 87					
350				2.6 20	2.1 32	1.8 41	1.6 50	1.4 57	1.3 65	1 90					
360				2.6 21	2.1 33	1.8 43	1.6 52	1.4 59	1.3 67	1 92					
370				2.6 22	2.1 34	1.8 44	1.6 53	1.4 61	1.3 69	1 95					
380				2.6 23	2.1 35	1.8 46	1.6 55	1.4 63	1.3 71	1 98					
390				2.6 24	2 37	1.8 47	1.6 56	1.4 65	1.3 73	1 100					
400				2.6 25	2 38	1.8 49	1.5 58	1.4 67	1.3 74						
410				2.6 26	2 39	1.8 50	1.5 60	1.4 68	1.3 77						
420				2.5 27	2 40	1.7 51	1.5 61	1.4 70	1.3 79						
430				2.5 28	2 41	1.7 53	1.5 63	1.4 72	1.3 80						
440				2.5 29	2 43	1.7 54	1.5 64	1.4 74	1.3 83						
450				2.5 30	2 44	1.7 56	1.5 66	1.4 76	1.3 84						
460			3.7 10	2.5 31	2 45	1.7 57	1.5 68	1.4 77	1.3 86						
470			3.7 11	2.5 32	2 46	1.7 58	1.5 69	1.4 79	1.3 88						
480			3.6 12	2.5 33	2 47	1.7 60	1.5 71	1.4 81	1.3 90						
490			3.6 13	2.5 34	2 49	1.7 61	1.5 72	1.4 83	1.3 92						
500			3.6 14	2.5 35	2 50	1.7 62	1.5 74	1.4 85	1.3 94						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															0.7 10
40															0.7 13
50													0.9 11	0.8 14	0.7 17
60												1 11	0.9 14	0.7 17	0.7 21
70											1.2 11	1 14	0.9 16	0.7 21	0.7 25
80											1.1 13	1 16	0.9 19	0.7 24	0.7 28
90										1.4 11	1.1 15	1 18	0.9 21	0.7 27	0.6 32
100										1.4 12	1.1 17	1 21	0.9 24	0.7 30	0.6 36
110										1.4 14	1.1 19	1 23	0.9 27	0.7 33	0.6 39
120										1.3 16	1.1 21	1 25	0.9 29	0.7 37	0.6 43
130									1.8 10	1.3 17	1.1 23	0.9 28	0.9 32	0.7 40	0.6 47
140									1.8 11	1.3 19	1.1 25	0.9 30	0.8 35	0.7 43	0.6 51
150								2 10	1.8 13	1.3 20	1.1 27	0.9 32	0.8 37	0.7 46	0.6 54
160								2 11	1.8 14	1.3 22	1.1 29	0.9 34	0.8 40	0.7 49	0.6 58
170								1.9 12	1.7 15	1.3 23	1.1 30	0.9 37	0.8 42	0.7 53	0.6 62
180							2.2 10	1.9 13	1.7 16	1.3 25	1.1 32	0.9 39	0.8 45	0.7 56	0.6 65
190							2.2 11	1.9 15	1.7 17	1.3 27	1.1 34	0.9 41	0.8 48	0.7 59	0.6 69
200							2.2 12	1.9 16	1.7 18	1.3 28	1.1 36	0.9 43	0.8 50	0.7 62	0.6 73
210							2.1 13	1.9 17	1.7 20	1.3 30	1.1 38	0.9 46	0.8 53	0.7 65	0.6 76
220						2.5 10	2.1 14	1.9 18	1.7 21	1.3 31	1.1 40	0.9 48	0.8 55	0.7 68	0.6 80
230						2.5 11	2.1 15	1.9 19	1.7 22	1.3 33	1.1 42	0.9 50	0.8 58	0.7 72	0.6 84
240						2.5 12	2.1 16	1.9 20	1.7 23	1.3 34	1.1 44	0.9 52	0.8 60	0.7 75	0.6 87
250						2.4 13	2.1 17	1.9 21	1.7 24	1.3 36	1.1 46	0.9 55	0.8 63	0.7 78	0.6 91
260						2.4 14	2.1 18	1.8 22	1.7 25	1.3 37	1.1 48	0.9 57	0.8 66	0.7 81	0.6 95
270						2.4 14	2.1 19	1.8 23	1.7 26	1.3 39	1.1 50	0.9 59	0.8 68	0.7 84	0.6 99
280					2.9 10	2.4 15	2.1 20	1.8 24	1.7 28	1.3 40	1.1 52	0.9 62	0.8 71	0.7 87	
290					2.9 11	2.4 16	2.1 21	1.8 25	1.7 29	1.3 42	1.1 54	0.9 64	0.8 73	0.7 91	
300					2.9 11	2.4 17	2.1 22	1.8 26	1.7 30	1.3 44	1.1 55	0.9 66	0.8 76	0.7 94	
310					2.9 12	2.4 18	2.1 23	1.8 27	1.7 31	1.3 45	1.1 57	0.9 68	0.8 79	0.7 97	
320					2.9 13	2.4 18	2 23	1.8 28	1.7 32	1.3 47	1.1 59	0.9 71	0.8 81	0.7 100	
330					2.9 13	2.4 19	2 24	1.8 29	1.7 33	1.3 48	1.1 61	0.9 73	0.8 84		
340					2.9 14	2.4 20	2 25	1.8 30	1.7 34	1.3 50	1.1 63	0.9 75	0.8 86		
350					2.8 15	2.4 21	2 26	1.8 31	1.7 35	1.3 51	1 65	0.9 77	0.8 89		
360					2.8 15	2.3 22	2 27	1.8 32	1.6 37	1.3 53	1 67	0.9 80	0.8 92		
370					2.8 16	2.3 22	2 28	1.8 33	1.6 38	1.3 54	1 69	0.9 82	0.8 94		
380					2.8 17	2.3 23	2 29	1.8 34	1.6 39	1.3 56	1 71	0.9 84	0.8 97		
390					2.8 17	2.3 24	2 30	1.8 35	1.6 40	1.3 57	1 73	0.9 87	0.8 99		
400				3.6 10	2.8 18	2.3 25	2 31	1.8 36	1.6 41	1.3 59	1 75	0.9 89			
410				3.6 10	2.8 19	2.3 25	2 31	1.8 37	1.6 42	1.3 61	1 77	0.9 91			
420				3.6 11	2.8 19	2.3 26	2 32	1.8 38	1.6 43	1.2 62	1 78	0.9 93			
430				3.6 11	2.8 20	2.3 27	2 33	1.8 39	1.6 44	1.2 64	1 80	0.9 96			
440				3.6 12	2.8 21	2.3 28	2 34	1.8 40	1.6 45	1.2 65	1 82	0.9 98			
450				3.6 12	2.8 21	2.3 28	2 35	1.8 41	1.6 47	1.2 67	1 84	0.9 100			
460				3.6 13	2.8 22	2.3 29	2 36	1.8 42	1.6 48	1.2 68	1 86				
470				3.6 13	2.8 22	2.3 30	2 37	1.8 43	1.6 49	1.2 70	1 88				
480				3.5 14	2.8 23	2.3 31	2 38	1.8 44	1.6 50	1.2 71	1 90				
490				3.5 14	2.8 24	2.3 31	2 38	1.8 45	1.6 51	1.2 73	1 92				
500				3.5 15	2.7 24	2.3 32	2 39	1.8 46	1.6 52	1.2 74	1 94				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50														0.8 10	0.7 13
60													0.9 10	0.8 14	0.7 17
70												1 10	0.9 13	0.8 17	0.7 20
80											1.2 12	1 13	0.9 15	0.7 20	0.7 24
90											1.2 14	1 15	0.9 18	0.7 23	0.7 28
100											1.2 16	1 17	0.9 21	0.7 26	0.7 31
110										1.4 11	1.1 18	1 20	0.9 23	0.7 30	0.6 35
120										1.4 12	1.1 20	1 22	0.9 26	0.7 33	0.6 39
130										1.4 14	1.1 22	1 24	0.9 29	0.7 36	0.6 43
140										1.4 16	1.1 24	1 27	0.9 31	0.7 39	0.6 46
150										1.4 17	1.1 26	1 29	0.9 34	0.7 42	0.6 50
160									1.8 10	1.3 19	1.1 28	0.9 31	0.8 36	0.7 46	0.6 54
170									1.8 11	1.3 21	1.1 30	0.9 34	0.8 39	0.7 49	0.6 57
180								2 10	1.8 13	1.3 22	1.1 32	0.9 36	0.8 42	0.7 52	0.6 61
190								2 11	1.8 14	1.3 24	1.1 34	0.9 38	0.8 44	0.7 55	0.6 65
200								2 12	1.8 15	1.3 25	1.1 35	0.9 40	0.8 47	0.7 58	0.6 69
210								2 13	1.7 17	1.3 27	1.1 37	0.9 43	0.8 50	0.7 62	0.6 72
220						2.2 10	1.9 14	1.7 18	1.3 29	1.1 39	0.9 45	0.8 52	0.7 65	0.6 76	
230						2.2 11	1.9 15	1.7 19	1.3 30	1.1 41	0.9 47	0.8 55	0.7 68	0.6 80	
240						2.2 12	1.9 17	1.7 20	1.3 32	1.1 43	0.9 50	0.8 57	0.7 71	0.6 83	
250						2.2 13	1.9 18	1.7 21	1.3 33	1.1 45	0.9 52	0.8 60	0.7 74	0.6 87	
260						2.1 14	1.9 19	1.7 22	1.3 35	1.1 47	0.9 54	0.8 62	0.7 77	0.6 91	
270						2.1 15	1.9 20	1.7 23	1.3 36	1.1 49	0.9 56	0.8 65	0.7 81	0.6 95	
280						2.1 16	1.9 21	1.7 24	1.3 38	1.1 51	0.9 59	0.8 68	0.7 84	0.6 98	
290						2.1 17	1.9 22	1.7 25	1.3 39	1.1 53	0.9 61	0.8 70	0.7 87		
300						2.1 18	1.9 23	1.7 26	1.3 41	1.1 55	0.9 63	0.8 73	0.7 90		
310						2.1 19	1.9 24	1.7 27	1.3 43	1.1 57	0.9 65	0.8 75	0.7 93		
320						2.1 20	1.9 25	1.7 28	1.3 44	1.1 59	0.9 68	0.8 78	0.7 96		
330						2.1 21	1.9 26	1.7 29	1.3 46	1.1 61	0.9 70	0.8 81	0.7 100		
340						2.1 22	1.9 27	1.7 30	1.3 47	1.1 63	0.9 72	0.8 83			
350						2.1 23	1.9 28	1.7 31	1.3 49	1.1 65	0.9 75	0.8 86			
360						2.1 24	1.9 29	1.7 32	1.3 50	1.1 67	0.9 77	0.8 88			
370						2.1 25	1.9 30	1.7 33	1.3 52	1.1 69	0.9 79	0.8 91			
380						2.1 26	1.9 31	1.7 34	1.3 53	1.1 71	0.9 81	0.8 94			
390						2.1 27	1.9 32	1.7 35	1.3 55	1.1 73	0.9 84	0.8 96			
400						2.1 28	1.9 33	1.7 36	1.3 57	1.1 75	0.9 86	0.8 99			
410						2.1 29	1.9 34	1.7 37	1.3 58	1.1 77	0.9 88				
420						2.1 30	1.9 35	1.7 38	1.3 60	1.1 79	0.9 91				
430						2.1 31	1.9 36	1.7 39	1.3 61	1.1 81	0.9 93				
440						2.1 32	1.9 37	1.7 40	1.3 63	1.1 83	0.9 95				
450						2.1 33	1.9 38	1.7 41	1.3 64	1.1 85	0.9 97				
460						2.1 34	1.9 39	1.7 42	1.3 66	1.1 87	0.9 100				
470						2.1 35	1.9 40	1.7 43	1.3 67	1.1 89					
480						2.1 36	1.9 41	1.7 44	1.3 69	1.1 91					
490						2.1 37	1.9 42	1.7 45	1.3 70	1.1 93					
500						2.1 38	1.9 43	1.7 46	1.3 72	1.1 95					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															0.7 12
50														0.8 13	0.7 16
60													0.9 12	0.8 16	0.7 20
70												1 11	0.9 14	0.8 19	0.7 23
80											1.2 10	1 14	0.9 17	0.7 23	0.7 27
90											1.2 12	1 16	0.9 20	0.7 26	0.7 31
100											1.2 14	1 19	0.9 23	0.7 29	0.7 35
110										1.4 10	1.2 16	1 21	0.9 25	0.7 32	0.6 38
120										1.4 12	1.1 19	1 24	0.9 28	0.7 35	0.6 42
130										1.4 14	1.1 21	1 26	0.9 31	0.7 39	0.6 46
140										1.4 16	1.1 23	1 28	0.9 33	0.7 42	0.6 50
150										1.4 17	1.1 25	1 31	0.9 36	0.7 45	0.6 53
160										1.4 19	1.1 27	0.9 33	0.9 38	0.7 48	0.6 57
170								1.9 10	1.3 21	1.1 29	0.9 35	0.8 41	0.7 52	0.6 61	
180								1.8 11	1.3 22	1.1 31	0.9 37	0.8 44	0.7 55	0.6 64	
190								1.8 13	1.3 24	1.1 33	0.9 40	0.8 46	0.7 58	0.6 68	
200								2 10	1.8 14	1.3 26	1.1 34	0.9 42	0.8 49	0.7 61	0.6 72
210								2 11	1.8 15	1.3 27	1.1 36	0.9 44	0.8 51	0.7 64	0.6 76
220								2 13	1.8 17	1.3 29	1.1 38	0.9 47	0.8 54	0.7 67	0.6 79
230								2 14	1.8 18	1.3 31	1.1 40	0.9 49	0.8 57	0.7 71	0.6 83
240							2.3 10	2 15	1.7 19	1.3 32	1.1 42	0.9 51	0.8 59	0.7 74	0.6 87
250							2.2 11	1.9 16	1.7 20	1.3 34	1.1 44	0.9 53	0.8 62	0.7 77	0.6 90
260							2.2 12	1.9 17	1.7 22	1.3 35	1.1 46	0.9 56	0.8 65	0.7 80	0.6 94
270							2.2 13	1.9 19	1.7 23	1.3 37	1.1 48	0.9 58	0.8 67	0.7 83	0.6 98
280							2.2 14	1.9 20	1.7 24	1.3 38	1.1 50	0.9 60	0.8 70	0.7 86	
290							2.2 15	1.9 21	1.7 25	1.3 40	1.1 52	0.9 63	0.8 72	0.7 90	
300							2.1 16	1.9 22	1.7 27	1.3 42	1.1 54	0.9 65	0.8 75	0.7 93	
310						2.5 11	2.1 18	1.9 23	1.7 28	1.3 43	1.1 56	0.9 67	0.8 78	0.7 96	
320						2.5 11	2.1 19	1.9 24	1.7 29	1.3 45	1.1 58	0.9 69	0.8 80	0.7 99	
330						2.5 13	2.1 20	1.9 25	1.7 30	1.3 46	1.1 60	0.9 72	0.8 83		
340						2.5 13	2.1 21	1.9 26	1.7 31	1.3 48	1.1 62	0.9 74	0.8 85		
350						2.5 14	2.1 22	1.9 27	1.7 32	1.3 49	1.1 64	0.9 76	0.8 88		
360						2.5 15	2.1 23	1.8 28	1.7 34	1.3 51	1.1 66	0.9 79	0.8 90		
370						2.4 16	2.1 23	1.8 29	1.7 35	1.3 53	1.1 67	0.9 81	0.8 93		
380						2.4 17	2.1 24	1.8 31	1.7 36	1.3 54	1.1 69	0.9 83	0.8 96		
390						2.4 18	2.1 25	1.8 32	1.7 37	1.3 56	1.1 71	0.9 85	0.8 98		
400						2.4 19	2.1 26	1.8 33	1.7 38	1.3 57	1.1 73	0.9 88			
410					3 10	2.4 20	2.1 27	1.8 34	1.7 39	1.3 59	1.1 75	0.9 90			
420					3 11	2.4 21	2.1 28	1.8 35	1.7 41	1.3 60	1 77	0.9 92			
430					2.9 12	2.4 22	2 29	1.8 36	1.7 42	1.3 62	1 79	0.9 94			
440					2.9 12	2.4 22	2 30	1.8 37	1.7 43	1.3 63	1 81	0.9 97			
450					2.9 13	2.4 23	2 31	1.8 38	1.6 44	1.3 65	1 83	0.9 99			
460					2.9 14	2.4 24	2 32	1.8 39	1.6 45	1.3 67	1 85				
470					2.9 15	2.4 25	2 33	1.8 40	1.6 46	1.3 68	1 87				
480					2.9 16	2.3 26	2 34	1.8 41	1.6 47	1.3 70	1 89				
490					2.9 16	2.3 27	2 35	1.8 42	1.6 48	1.3 71	1 91				
500					2.9 17	2.3 28	2 36	1.8 43	1.6 50	1.3 73	1 92				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 12
60														0.9 12	0.7 14
70													1 10	0.9 14	0.7 17
80												1.2 10	1 12	0.8 16	0.7 20
90												1.2 12	1 14	0.8 18	0.7 22
100											1.3 10	1.1 13	1 16	0.8 21	0.7 25
110											1.3 12	1.1 15	1 18	0.8 23	0.7 28
120											1.3 13	1.1 17	1 20	0.8 25	0.7 30
130										1.6 10	1.3 14	1.1 18	1 22	0.8 28	0.7 33
140										1.6 11	1.3 16	1.1 20	1 23	0.8 30	0.7 36
150										1.6 12	1.3 17	1.1 21	1 25	0.8 32	0.7 38
160										1.6 13	1.3 18	1.1 23	1 27	0.8 34	0.7 41
170										1.6 14	1.3 20	1.1 25	1 29	0.8 37	0.7 44
180										1.6 15	1.3 21	1.1 26	1 31	0.8 39	0.7 46
190										1.6 16	1.3 22	1.1 28	1 32	0.8 41	0.7 49
200									2.2 10	1.5 17	1.3 24	1.1 29	1 34	0.8 43	0.7 51
210									2.1 10	1.5 19	1.3 25	1.1 31	1 36	0.8 46	0.7 54
220									2.1 11	1.5 20	1.3 26	1.1 32	1 38	0.8 48	0.7 57
230									2.1 12	1.5 21	1.3 28	1.1 34	1 40	0.8 50	0.7 59
240								2.4 10	2.1 13	1.5 22	1.3 29	1.1 36	1 42	0.8 52	0.7 62
250								2.3 11	2.1 14	1.5 23	1.2 30	1.1 37	1 43	0.8 55	0.7 65
260								2.3 12	2.1 15	1.5 24	1.2 32	1.1 39	1 45	0.8 57	0.7 67
270								2.3 13	2.1 16	1.5 25	1.2 33	1.1 40	1 47	0.8 59	0.7 70
280								2.3 14	2.1 17	1.5 26	1.2 34	1.1 42	1 49	0.8 61	0.7 73
290						2.6 10	2.3 14	2.1 17	1.5 27	1.2 36	1.1 43	1 51	1 51	0.8 64	0.7 75
300						2.6 11	2.3 14	2.1 17	1.5 28	1.2 37	1.1 45	1 52	1 52	0.8 66	0.7 78
310						2.6 11	2.3 15	2 18	1.5 29	1.2 38	1.1 47	1 54	1 54	0.8 68	0.7 80
320						2.6 12	2.3 16	2 19	1.5 30	1.2 40	1.1 48	0.9 56	0.8 70	0.7 83	
330						2.6 13	2.3 16	2 20	1.5 31	1.2 41	1.1 50	0.9 58	0.8 73	0.7 86	
340						2.6 13	2.3 17	2 21	1.5 32	1.2 42	1.1 51	0.9 60	0.8 75	0.7 88	
350						2.6 14	2.3 18	2 21	1.5 33	1.2 44	1.1 53	0.9 61	0.8 77	0.7 91	
360						2.6 14	2.3 18	2 22	1.5 34	1.2 45	1.1 55	0.9 63	0.8 79	0.7 94	
370						3 10	2.6 15	2 23	1.5 35	1.2 46	1.1 56	0.9 65	0.8 82	0.7 96	
380						3 11	2.6 16	2 24	1.5 36	1.2 48	1.1 58	0.9 67	0.8 84	0.7 99	
390						3 11	2.6 16	2 24	1.5 38	1.2 49	1.1 59	0.9 69	0.8 86		
400						3 12	2.6 17	2 25	1.5 39	1.2 50	1.1 61	0.9 71	0.8 88		
410						3 13	2.5 17	2 26	1.5 40	1.2 52	1.1 62	0.9 72	0.8 91		
420						3 13	2.5 18	2 27	1.5 41	1.2 53	1.1 64	0.9 74	0.8 93		
430						3 14	2.5 19	2 27	1.5 42	1.2 54	1.1 66	0.9 76	0.8 95		
440						3 14	2.5 19	2 28	1.5 43	1.2 56	1.1 67	0.9 78	0.8 97		
450						3 15	2.5 20	2 29	1.5 44	1.2 57	1.1 69	0.9 80	0.8 99		
460						3 15	2.5 20	2 30	1.5 45	1.2 58	1.1 70	0.9 81			
470						3 16	2.5 21	2 30	1.5 46	1.2 59	1.1 72	0.9 83			
480					3.6 10	2.9 16	2.5 22	2 31	1.5 47	1.2 61	1.1 73	0.9 85			
490					3.6 10	2.9 17	2.5 22	2 32	1.5 48	1.2 62	1.1 75	0.9 87			
500					3.6 11	2.9 17	2.5 23	2 33	1.5 49	1.2 63	1.1 76	0.9 89			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 11
60														0.9 11	0.8 14
70														0.9 13	0.7 16
80													1.1 11	0.9 15	0.7 19
90												1.2 10	1 13	0.8 18	0.7 22
100												1.2 12	1 15	0.8 20	0.7 24
110											1.4 10	1.2 14	1 17	0.8 22	0.7 27
120											1.3 11	1.1 15	1 19	0.8 25	0.7 30
130											1.3 13	1.1 17	1 21	0.8 27	0.7 32
140											1.3 14	1.1 19	1 22	0.8 29	0.7 35
150										1.6 10	1.3 16	1.1 20	1 24	0.8 31	0.7 38
160										1.6 11	1.3 17	1.1 22	1 26	0.8 34	0.7 40
170										1.6 12	1.3 18	1.1 24	1 28	0.8 36	0.7 43
180										1.6 14	1.3 20	1.1 25	1 30	0.8 38	0.7 46
190										1.6 15	1.3 21	1.1 27	1 32	0.8 40	0.7 48
200										1.6 16	1.3 23	1.1 28	1 34	0.8 43	0.7 51
210										1.6 17	1.3 24	1.1 30	1 35	0.8 45	0.7 54
220										1.6 18	1.3 25	1.1 32	1 37	0.8 47	0.7 56
230										1.6 19	1.3 27	1.1 33	1 39	0.8 50	0.7 59
240								2.2 10	1.5 20	1.3 28	1.1 35	1 41	0.8 52	0.7 62	
250								2.2 11	1.5 21	1.3 29	1.1 36	1 43	0.8 54	0.7 64	
260								2.1 12	1.5 22	1.3 31	1.1 38	1 45	0.8 56	0.7 67	
270								2.1 12	1.5 24	1.3 32	1.1 40	1 46	0.8 59	0.7 70	
280								2.1 13	1.5 25	1.2 33	1.1 41	1 48	0.8 61	0.7 72	
290								2.4 10	2.1 14	1.5 26	1.2 35	1.1 43	1 50	0.8 63	0.7 75
300								2.4 11	2.1 15	1.5 27	1.2 36	1.1 44	1 52	0.8 65	0.7 77
310								2.4 12	2.1 16	1.5 28	1.2 37	1.1 46	1 54	0.8 68	0.7 80
320								2.3 13	2.1 17	1.5 29	1.2 39	1.1 48	1 55	0.8 70	0.7 83
330								2.3 13	2.1 18	1.5 30	1.2 40	1.1 49	1 57	0.8 72	0.7 85
340								2.3 14	2.1 18	1.5 31	1.2 41	1.1 51	1 59	0.8 74	0.7 88
350						2.7 10	2.3 15	2.1 19	1.5 32	1.2 43	1.1 52	1 61	0.8 77	0.7 91	
360						2.7 11	2.3 16	2.1 20	1.5 33	1.2 44	1.1 54	0.9 63	0.8 79	0.7 93	
370						2.6 12	2.3 16	2 21	1.5 34	1.2 45	1.1 55	0.9 64	0.8 81	0.7 96	
380						2.6 12	2.3 17	2 22	1.5 35	1.2 47	1.1 57	0.9 66	0.8 83	0.7 99	
390						2.6 13	2.3 18	2 22	1.5 36	1.2 48	1.1 59	0.9 68	0.8 86		
400						2.6 14	2.3 19	2 23	1.5 37	1.2 49	1.1 60	0.9 70	0.8 88		
410						2.6 14	2.3 19	2 24	1.5 38	1.2 51	1.1 62	0.9 72	0.8 90		
420						2.6 15	2.3 20	2 25	1.5 40	1.2 52	1.1 63	0.9 74	0.8 92		
430						2.6 16	2.3 21	2 25	1.5 41	1.2 53	1.1 65	0.9 75	0.8 95		
440						3.1 10	2.6 16	2.2 22	2 26	1.5 42	1.2 55	1.1 66	0.9 77	0.8 97	
450						3.1 10	2.6 17	2.2 22	2 27	1.5 43	1.2 56	1.1 68	0.9 79	0.8 99	
460						3 11	2.6 17	2.2 23	2 28	1.5 44	1.2 57	1.1 70	0.9 81		
470						3 11	2.6 18	2.2 24	2 28	1.5 45	1.2 59	1.1 71	0.9 83		
480						3 12	2.5 19	2.2 24	2 29	1.5 46	1.2 60	1.1 73	0.9 84		
490						3 13	2.5 19	2.2 25	2 30	1.5 47	1.2 61	1.1 74	0.9 86		
500						3 13	2.5 20	2.2 26	2 31	1.5 48	1.2 63	1.1 76	0.9 88		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 10
60														0.9 10	0.8 13
70														0.9 12	0.8 16
80													1.1 10	0.9 15	0.7 18
90													1.1 12	0.9 17	0.7 21
100												1.2 10	1.1 14	0.8 19	0.7 24
110												1.2 12	1 16	0.8 22	0.7 26
120												1.2 14	1 18	0.8 24	0.7 29
130											1.4 11	1.2 16	1 20	0.8 26	0.7 32
140											1.4 13	1.1 17	1 22	0.8 29	0.7 34
150											1.3 14	1.1 19	1 23	0.8 31	0.7 37
160											1.3 16	1.1 21	1 25	0.8 33	0.7 40
170										1.7 10	1.3 17	1.1 22	1 27	0.8 35	0.7 42
180										1.7 11	1.3 19	1.1 24	1 29	0.8 38	0.7 45
190										1.6 12	1.3 20	1.1 26	1 31	0.8 40	0.7 48
200										1.6 14	1.3 21	1.1 27	1 33	0.8 42	0.7 51
210										1.6 15	1.3 23	1.1 29	1 35	0.8 44	0.7 53
220										1.6 16	1.3 24	1.1 31	1 36	0.8 47	0.7 56
230										1.6 17	1.3 25	1.1 32	1 38	0.8 49	0.7 58
240										1.6 18	1.3 27	1.1 34	1 40	0.8 51	0.7 61
250										1.6 20	1.3 28	1.1 36	1 42	0.8 54	0.7 64
260										1.6 21	1.3 30	1.1 37	1 44	0.8 56	0.7 66
270										1.6 22	1.3 31	1.1 39	1 46	0.8 58	0.7 69
280								2.2 10		1.5 23	1.3 32	1.1 40	1 47	0.8 60	0.7 72
290								2.2 11		1.5 24	1.3 34	1.1 42	1 49	0.8 63	0.7 74
300								2.2 12		1.5 25	1.3 35	1.1 43	1 51	0.8 65	0.7 77
310								2.1 13		1.5 26	1.3 36	1.1 45	1 53	0.8 67	0.7 80
320								2.1 14		1.5 27	1.2 38	1.1 47	1 55	0.8 69	0.7 82
330							2.4 10	2.1 15		1.5 29	1.2 39	1.1 48	1 57	0.8 72	0.7 85
340							2.4 10	2.1 15		1.5 30	1.2 41	1.1 50	1 58	0.8 74	0.7 88
350							2.4 11	2.1 16		1.5 31	1.2 42	1.1 51	1 60	0.8 76	0.7 90
360							2.4 12	2.1 17		1.5 32	1.2 43	1.1 53	1 62	0.8 78	0.7 93
370							2.4 13	2.1 18		1.5 33	1.2 44	1.1 55	1 64	0.8 81	0.7 96
380							2.3 14	2.1 19		1.5 34	1.2 46	1.1 56	1 66	0.8 83	0.7 98
390							2.3 15	2.1 20		1.5 35	1.2 47	1.1 58	1 68	0.8 85	
400							2.3 16	2.1 21		1.5 36	1.2 48	1.1 59	0.9 69	0.8 87	
410							2.7 10	2.3 16	2.1 21	1.5 37	1.2 50	1.1 61	0.9 71	0.8 90	
420							2.7 11	2.3 17	2 22	1.5 38	1.2 51	1.1 63	0.9 73	0.8 92	
430							2.7 12	2.3 18	2 23	1.5 39	1.2 52	1.1 64	0.9 75	0.8 94	
440							2.7 13	2.3 19	2 24	1.5 40	1.2 54	1.1 66	0.9 77	0.8 96	
450							2.6 13	2.3 19	2 25	1.5 42	1.2 55	1.1 67	0.9 79	0.8 99	
460							2.6 14	2.3 20	2 26	1.5 43	1.2 56	1.1 69	0.9 80		
470							2.6 14	2.3 21	2 26	1.5 44	1.2 58	1.1 70	0.9 82		
480							2.6 15	2.3 22	2 27	1.5 45	1.2 59	1.1 72	0.9 84		
490							2.6 16	2.3 22	2 28	1.5 46	1.2 60	1.1 74	0.9 86		
500							2.6 16	2.3 23	2 29	1.5 47	1.2 62	1.1 75	0.9 88		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10														0.7 10	0.6 12
20														0.6 16	0.6 19
30														0.6 22	0.6 26
40										1.1 10	0.9 13	0.8 16	0.7 18	0.6 28	0.6 33
50										1.1 13	0.9 17	0.8 20	0.7 23	0.6 34	0.6 40
60									1.4 11	1 16	0.9 21	0.8 24	0.7 28	0.6 40	0.6 46
70								1.5 11	1.3 13	1 19	0.9 24	0.8 29	0.7 33	0.6 46	0.6 53
80							1.6 11	1.5 13	1.3 15	1 22	0.9 28	0.8 33	0.7 38	0.6 52	0.6 60
90						1.8 10	1.6 13	1.4 16	1.3 18	1 26	0.9 32	0.8 38	0.7 43	0.6 58	0.5 67
100						1.8 12	1.6 15	1.4 18	1.3 20	1 29	0.9 36	0.8 42	0.7 48	0.6 64	0.5 74
110					2.1 10	1.8 14	1.6 17	1.4 20	1.3 23	1 32	0.9 39	0.8 46	0.7 53	0.6 70	0.5 80
120					2.1 11	1.8 15	1.5 19	1.4 22	1.3 25	1 35	0.9 43	0.8 51	0.7 57	0.6 75	0.5 87
130					2.1 13	1.7 17	1.5 21	1.4 24	1.3 27	1 38	0.8 47	0.8 55	0.7 62	0.6 81	0.5 94
140					2 14	1.7 19	1.5 23	1.4 26	1.3 29	1 41	0.8 51	0.8 59	0.7 67	0.6 87	
150				2.5 10	2 16	1.7 20	1.5 25	1.4 28	1.2 32	1 44	0.8 54	0.8 64	0.7 72	0.6 93	
160				2.5 11	2 17	1.7 22	1.5 26	1.4 30	1.2 34	1 47	0.8 58	0.8 68	0.7 77	0.6 99	
170				2.5 12	2 19	1.7 24	1.5 28	1.3 33	1.2 36	1 50	0.8 62	0.8 72	0.7 82		
180				2.5 13	2 20	1.7 25	1.5 30	1.3 35	1.2 39	1 53	0.8 66	0.8 77	0.7 87		
190				2.4 15	2 21	1.7 27	1.5 32	1.3 37	1.2 41	1 56	0.8 69	0.8 81	0.7 92		
200				2.4 16	2 23	1.7 29	1.5 34	1.3 39	1.2 43	1 59	0.8 73	0.8 86	0.7 97		
210				2.4 17	1.9 24	1.7 30	1.5 36	1.3 41	1.2 46	1 62	0.8 77	0.8 90			
220				2.4 18	1.9 26	1.7 32	1.5 38	1.3 43	1.2 48	1 66	0.8 81	0.8 94			
230				2.4 19	1.9 27	1.7 34	1.5 40	1.3 45	1.2 50	1 69	0.8 84	0.8 98			
240		3.3 10		2.4 20	1.9 28	1.6 35	1.5 42	1.3 47	1.2 53	1 72	0.8 88				
250		3.3 11		2.4 21	1.9 30	1.6 37	1.5 43	1.3 49	1.2 55	1 75	0.8 92				
260		3.3 11	2.3 23	1.9 31	1.6 38	1.5 45	1.3 51	1.2 57	1 78	0.8 96					
270		3.3 12	2.3 24	1.9 32	1.6 40	1.5 47	1.3 53	1.2 60	1 81	0.8 99					
280		3.3 13	2.3 25	1.9 34	1.6 42	1.5 49	1.3 56	1.2 62	1 84						
290		3.2 14	2.3 26	1.9 35	1.6 43	1.4 51	1.3 58	1.2 64	1 87						
300		3.2 15	2.3 27	1.9 37	1.6 45	1.4 53	1.3 60	1.2 66	1 90						
310		3.2 16	2.3 28	1.9 38	1.6 47	1.4 55	1.3 62	1.2 69	1 93						
320		3.2 17	2.3 29	1.9 39	1.6 48	1.4 56	1.3 64	1.2 71	1 96						
330		3.2 17	2.3 30	1.9 41	1.6 50	1.4 58	1.3 66	1.2 73	1 99						
340		3.2 18	2.3 31	1.9 42	1.6 51	1.4 60	1.3 68	1.2 76							
350		3.2 19	2.3 32	1.9 43	1.6 53	1.4 62	1.3 70	1.2 78							
360		3.1 20	2.3 34	1.9 45	1.6 55	1.4 64	1.3 72	1.2 80							
370		3.1 21	2.3 35	1.9 46	1.6 56	1.4 66	1.3 74	1.2 82							
380		3.1 22	2.3 36	1.9 47	1.6 58	1.4 67	1.3 76	1.2 85							
390		3.1 22	2.3 37	1.9 49	1.6 59	1.4 69	1.3 78	1.2 87							
400		3.1 23	2.3 38	1.9 50	1.6 61	1.4 71	1.3 81	1.2 89							
410		3.1 24	2.3 39	1.9 52	1.6 63	1.4 73	1.3 83	1.2 92							
420		3.1 25	2.3 40	1.9 53	1.6 64	1.4 75	1.3 85	1.2 94							
430		3.1 26	2.3 41	1.9 54	1.6 66	1.4 77	1.3 87	1.2 96							
440		3.1 26	2.3 42	1.9 56	1.6 68	1.4 79	1.3 89	1.2 99							
450		3.1 27	2.3 43	1.9 57	1.6 69	1.4 81	1.3 91								
460		3.1 28	2.3 44	1.9 58	1.6 71	1.4 82	1.3 93								
470		3.1 29	2.3 45	1.9 60	1.6 72	1.4 84	1.3 95								
480		3.1 29	2.3 47	1.9 61	1.6 74	1.4 86	1.3 97								
490		3.1 30	2.2 48	1.9 62	1.6 76	1.4 88	1.3 99								
500		3 31	2.2 49	1.9 64	1.6 77	1.4 90									

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20														0.7 10	0.6 12
30														0.6 16	0.6 19
40														0.6 22	0.6 26
50														0.6 28	0.6 32
60														0.6 34	0.6 39
70														0.6 40	0.6 46
80														0.6 46	0.6 53
90														0.6 51	0.6 60
100														0.6 57	0.5 66
110														0.6 63	0.5 73
120														0.6 69	0.5 80
130														0.6 75	0.5 87
140														0.6 81	0.5 93
150														0.6 87	0.5 100
160														0.6 93	
170														0.6 99	
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															0.6 11
30															0.6 18
40															0.6 25
50										1.1 10	0.9 15	0.8 19	0.7 22	0.6 27	0.6 32
60										1.1 14	0.9 19	0.8 23	0.7 27	0.6 33	0.6 39
70										1.1 17	0.9 23	0.8 28	0.7 32	0.6 39	0.6 46
80									1.4 12	1 21	0.9 27	0.8 32	0.7 37	0.6 45	0.6 52
90								1.6 12	1.4 15	1 24	0.9 31	0.8 36	0.7 42	0.6 51	0.6 59
100								1.5 14	1.3 17	1 27	0.9 34	0.8 41	0.7 47	0.6 57	0.5 66
110							1.7 13	1.5 17	1.3 20	1 30	0.9 38	0.8 45	0.7 52	0.6 63	0.5 73
120						1.9 10	1.6 15	1.4 19	1.3 22	1 33	0.9 42	0.8 50	0.7 56	0.6 69	0.5 80
130						1.9 12	1.6 17	1.4 21	1.3 25	1 36	0.9 46	0.8 54	0.7 61	0.6 75	0.5 86
140						1.8 14	1.6 19	1.4 24	1.3 27	1 39	0.9 49	0.8 58	0.7 66	0.6 81	0.5 93
150						1.8 16	1.6 21	1.4 26	1.3 30	1 43	0.8 53	0.8 63	0.7 71	0.6 86	0.5 100
160					2.2 11	1.8 18	1.6 23	1.4 28	1.3 32	1 46	0.8 57	0.8 67	0.7 76	0.6 92	
170					2.1 13	1.8 20	1.5 25	1.4 30	1.3 34	1 49	0.8 61	0.8 71	0.7 81	0.6 98	
180					2.1 15	1.8 22	1.5 27	1.4 32	1.3 37	1 52	0.8 65	0.8 76	0.7 86		
190					2.1 16	1.7 24	1.5 29	1.4 34	1.3 39	1 55	0.8 68	0.8 80	0.7 91		
200					2 18	1.7 25	1.5 31	1.4 37	1.2 41	1 58	0.8 72	0.8 85	0.7 96		
210					2 20	1.7 27	1.5 33	1.4 39	1.2 44	1 61	0.8 76	0.8 89			
220				2.6 10	2 21	1.7 29	1.5 35	1.4 41	1.2 46	1 64	0.8 80	0.8 93			
230				2.6 12	2 23	1.7 30	1.5 37	1.3 43	1.2 48	1 67	0.8 83	0.8 98			
240				2.5 13	2 24	1.7 32	1.5 39	1.3 45	1.2 51	1 70	0.8 87				
250				2.5 15	2 26	1.7 34	1.5 41	1.3 47	1.2 53	1 73	0.8 91				
260				2.5 16	2 27	1.7 36	1.5 43	1.3 49	1.2 55	1 77	0.8 95				
270				2.5 18	2 29	1.7 37	1.5 45	1.3 52	1.2 58	1 80	0.8 98				
280				2.4 19	2 30	1.7 39	1.5 47	1.3 54	1.2 60	1 83					
290				2.4 20	1.9 31	1.7 41	1.5 48	1.3 56	1.2 62	1 86					
300				2.4 21	1.9 33	1.7 42	1.5 50	1.3 58	1.2 65	1 89					
310				2.4 23	1.9 34	1.7 44	1.5 52	1.3 60	1.2 67	1 92					
320				2.4 24	1.9 36	1.7 46	1.5 54	1.3 62	1.2 69	1 95					
330				2.4 25	1.9 37	1.6 47	1.5 56	1.3 64	1.2 72	1 98					
340				2.4 26	1.9 39	1.6 49	1.5 58	1.3 66	1.2 74						
350				2.4 27	1.9 40	1.6 50	1.5 60	1.3 68	1.2 76						
360				2.4 29	1.9 41	1.6 52	1.5 62	1.3 70	1.2 79						
370			3.4 11	2.3 30	1.9 43	1.6 54	1.5 63	1.3 73	1.2 81						
380			3.4 12	2.3 31	1.9 44	1.6 55	1.4 65	1.3 75	1.2 83						
390			3.4 13	2.3 32	1.9 46	1.6 57	1.4 67	1.3 77	1.2 85						
400			3.3 14	2.3 33	1.9 47	1.6 59	1.4 69	1.3 79	1.2 88						
410			3.3 15	2.3 34	1.9 48	1.6 60	1.4 71	1.3 81	1.2 90						
420			3.3 16	2.3 36	1.9 50	1.6 62	1.4 73	1.3 83	1.2 92						
430			3.3 17	2.3 37	1.9 51	1.6 64	1.4 75	1.3 85	1.2 95						
440			3.2 18	2.3 38	1.9 53	1.6 65	1.4 77	1.3 87	1.2 97						
450			3.2 19	2.3 39	1.9 54	1.6 67	1.4 78	1.3 89	1.2 99						
460			3.2 20	2.3 40	1.9 55	1.6 69	1.4 80	1.3 91							
470			3.2 21	2.3 41	1.9 57	1.6 70	1.4 82	1.3 93							
480			3.2 22	2.3 42	1.9 58	1.6 72	1.4 84	1.3 95							
490			3.2 23	2.3 44	1.9 60	1.6 73	1.4 86	1.3 98							
500			3.2 23	2.3 45	1.9 61	1.6 75	1.4 88	1.3 100							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 11	0.6 13
40														0.7 15	0.6 17
50											1.1 10	0.9 13	0.8 15	0.7 19	0.6 22
60											1 13	0.9 16	0.8 18	0.7 23	0.6 27
70										1.3 11	1 15	0.9 19	0.8 22	0.7 27	0.6 32
80										1.2 13	1 18	0.9 22	0.8 25	0.7 31	0.6 36
90										1.2 16	1 20	0.9 25	0.8 28	0.7 35	0.6 41
100									1.6 11	1.2 18	1 23	0.9 27	0.8 32	0.7 39	0.6 46
110								1.7 10	1.6 13	1.2 20	1 25	0.9 30	0.8 35	0.7 43	0.6 50
120								1.7 12	1.6 14	1.2 22	1 28	0.9 33	0.8 38	0.7 47	0.6 55
130							1.9 11	1.7 13	1.6 16	1.2 24	1 30	0.9 36	0.8 42	0.7 51	0.6 60
140							1.9 12	1.7 15	1.5 17	1.2 26	1 33	0.9 39	0.8 45	0.7 55	0.6 64
150						2.2 10	1.9 13	1.7 16	1.5 19	1.2 28	1 35	0.9 42	0.8 48	0.7 59	0.6 69
160						2.2 11	1.9 15	1.7 18	1.5 20	1.2 30	1 38	0.9 45	0.8 52	0.7 63	0.6 74
170						2.2 12	1.9 16	1.7 19	1.5 22	1.2 32	1 40	0.9 48	0.8 55	0.7 67	0.6 78
180						2.1 13	1.8 17	1.7 20	1.5 23	1.1 34	1 43	0.9 51	0.8 58	0.7 71	0.6 83
190					2.6 10	2.1 14	1.8 18	1.6 22	1.5 25	1.1 36	1 45	0.9 54	0.8 62	0.7 76	0.6 88
200					2.5 10	2.1 15	1.8 19	1.6 23	1.5 26	1.1 38	1 48	0.9 57	0.8 65	0.7 80	0.6 93
210					2.5 11	2.1 16	1.8 21	1.6 24	1.5 28	1.1 40	1 50	0.8 60	0.8 68	0.7 84	0.6 97
220					2.5 12	2.1 17	1.8 22	1.6 26	1.5 29	1.1 42	1 53	0.8 63	0.8 72	0.7 88	
230					2.5 13	2.1 19	1.8 23	1.6 27	1.5 31	1.1 44	1 55	0.8 66	0.8 75	0.7 92	
240					2.5 14	2.1 20	1.8 24	1.6 29	1.5 32	1.1 46	1 58	0.8 69	0.8 78	0.7 96	
250					2.5 15	2.1 21	1.8 26	1.6 30	1.5 34	1.1 48	1 60	0.8 71	0.8 82	0.7 100	
260					2.4 16	2 22	1.8 27	1.6 31	1.5 35	1.1 50	1 63	0.8 74	0.8 85		
270				3.1 10	2.4 17	2 23	1.8 28	1.6 33	1.5 37	1.1 52	1 65	0.8 77	0.8 88		
280				3.1 10	2.4 18	2 24	1.8 29	1.6 34	1.5 38	1.1 54	1 68	0.8 80	0.8 92		
290				3.1 11	2.4 19	2 25	1.8 30	1.6 35	1.5 40	1.1 56	1 70	0.8 83	0.8 95		
300				3.1 12	2.4 20	2 26	1.8 31	1.6 37	1.5 41	1.1 58	1 73	0.8 86	0.8 98		
310				3.1 13	2.4 21	2 27	1.8 33	1.6 38	1.5 43	1.1 60	1 75	0.8 89			
320				3.1 13	2.4 21	2 28	1.8 34	1.6 39	1.5 44	1.1 62	1 78	0.8 92			
330				3 14	2.4 22	2 29	1.8 35	1.6 41	1.5 46	1.1 64	1 80	0.8 95			
340				3 15	2.4 23	2 30	1.8 36	1.6 42	1.5 47	1.1 66	1 83	0.8 98			
350				3 16	2.4 24	2 31	1.8 37	1.6 43	1.5 49	1.1 68	1 85				
360				3 16	2.4 25	2 32	1.8 39	1.6 45	1.4 50	1.1 70	1 88				
370				3 17	2.4 26	2 33	1.8 40	1.6 46	1.4 52	1.1 72	1 90				
380				3 18	2.4 27	2 34	1.8 41	1.6 47	1.4 53	1.1 74	1 93				
390				3 18	2.4 27	2 35	1.8 42	1.6 49	1.4 55	1.1 76	1 95				
400				3 19	2.4 28	2 36	1.8 43	1.6 50	1.4 56	1.1 79	1 98				
410				3 20	2.3 29	2 37	1.7 44	1.6 51	1.4 58	1.1 80	0.9 100				
420				3 20	2.3 30	2 38	1.7 46	1.6 53	1.4 59	1.1 82					
430				2.9 21	2.3 31	2 39	1.7 47	1.6 54	1.4 61	1.1 85					
440				2.9 22	2.3 32	2 40	1.7 48	1.6 55	1.4 62	1.1 87					
450				2.9 22	2.3 33	2 41	1.7 49	1.6 57	1.4 64	1.1 89					
460			4.2 10	2.9 23	2.3 33	2 42	1.7 50	1.6 58	1.4 65	1.1 91					
470			4.2 10	2.9 24	2.3 34	2 43	1.7 51	1.6 59	1.4 66	1.1 92					
480			4.2 11	2.9 24	2.3 35	2 44	1.7 53	1.6 61	1.4 68	1.1 95					
490			4.2 11	2.9 25	2.3 36	2 45	1.7 54	1.6 62	1.4 69	1.1 97					
500			4.2 12	2.9 26	2.3 37	2 46	1.7 55	1.6 63	1.4 71	1.1 99					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.7 10	0.6 12
40														0.7 14	0.6 17
50														0.7 18	0.6 22
60														0.7 22	0.6 26
70										1.3 10	1.1 12	0.9 15	0.8 18	0.7 26	0.6 31
80										1.3 12	1 17	0.9 21	0.8 24	0.7 30	0.6 36
90										1.2 14	1 19	0.9 24	0.8 28	0.7 35	0.6 41
100										1.2 16	1 22	0.9 27	0.8 31	0.7 39	0.6 45
110									1.6 11	1.2 19	1 25	0.9 30	0.8 34	0.7 43	0.6 50
120									1.6 12	1.2 21	1 27	0.9 33	0.8 38	0.7 47	0.6 55
130								1.8 11	1.6 14	1.2 23	1 30	0.9 36	0.8 41	0.7 51	0.6 59
140								1.7 13	1.6 16	1.2 25	1 32	0.9 39	0.8 44	0.7 55	0.6 64
150							2 11	1.7 14	1.6 17	1.2 27	1 35	0.9 42	0.8 48	0.7 59	0.6 69
160							1.9 12	1.7 16	1.6 19	1.2 29	1 37	0.9 44	0.8 51	0.7 63	0.6 73
170							1.9 13	1.7 17	1.5 20	1.2 31	1 40	0.9 47	0.8 54	0.7 67	0.6 78
180						2.2 10	1.9 15	1.7 19	1.5 22	1.2 33	1 42	0.9 50	0.8 58	0.7 71	0.6 83
190						2.2 11	1.9 16	1.7 20	1.5 24	1.2 35	1 45	0.9 53	0.8 61	0.7 75	0.6 87
200						2.2 12	1.9 17	1.7 21	1.5 25	1.2 37	1 47	0.9 56	0.8 64	0.7 79	0.6 92
210						2.2 14	1.9 19	1.7 23	1.5 27	1.1 39	1 50	0.9 59	0.8 68	0.7 83	0.6 97
220						2.1 15	1.8 20	1.7 24	1.5 28	1.1 41	1 52	0.8 62	0.8 71	0.7 87	
230						2.1 16	1.8 21	1.6 26	1.5 30	1.1 43	1 55	0.8 65	0.8 74	0.7 91	
240					2.6 11	2.1 17	1.8 22	1.6 27	1.5 31	1.1 45	1 57	0.8 68	0.8 78	0.7 95	
250					2.6 12	2.1 18	1.8 24	1.6 28	1.5 33	1.1 47	1 60	0.8 71	0.8 81	0.7 99	
260					2.5 13	2.1 19	1.8 25	1.6 30	1.5 34	1.1 49	1 62	0.8 74	0.8 84		
270					2.5 14	2.1 21	1.8 26	1.6 31	1.5 36	1.1 51	1 65	0.8 77	0.8 88		
280					2.5 15	2.1 22	1.8 27	1.6 33	1.5 37	1.1 53	1 67	0.8 80	0.8 91		
290					2.5 16	2.1 23	1.8 29	1.6 34	1.5 39	1.1 55	1 70	0.8 83	0.8 94		
300					2.5 17	2.1 24	1.8 30	1.6 35	1.5 40	1.1 57	1 72	0.8 85	0.8 98		
310					2.5 18	2 25	1.8 31	1.6 37	1.5 42	1.1 60	1 75	0.8 88			
320					2.4 18	2 26	1.8 32	1.6 38	1.5 43	1.1 62	1 77	0.8 91			
330					2.4 19	2 27	1.8 34	1.6 39	1.5 45	1.1 64	1 80	0.8 94			
340				3.2 10	2.4 20	2 28	1.8 35	1.6 41	1.5 46	1.1 66	1 82	0.8 97			
350				3.1 11	2.4 21	2 29	1.8 36	1.6 42	1.5 48	1.1 68	1 85	0.8 100			
360				3.1 12	2.4 22	2 30	1.8 37	1.6 43	1.5 49	1.1 70	1 87				
370				3.1 13	2.4 23	2 31	1.8 38	1.6 45	1.5 51	1.1 72	1 90				
380				3.1 13	2.4 24	2 32	1.8 39	1.6 46	1.5 52	1.1 74	1 92				
390				3.1 14	2.4 25	2 33	1.8 41	1.6 47	1.5 54	1.1 76	1 95				
400				3.1 15	2.4 26	2 34	1.8 42	1.6 49	1.5 55	1.1 78	1 97				
410				3 16	2.4 27	2 35	1.8 43	1.6 50	1.4 57	1.1 80	1 100				
420				3 17	2.4 28	2 37	1.8 44	1.6 51	1.4 58	1.1 82					
430				3 17	2.4 28	2 37	1.8 46	1.6 53	1.4 60	1.1 84					
440				3 18	2.4 29	2 39	1.8 47	1.6 54	1.4 61	1.1 86					
450				3 19	2.4 30	2 40	1.8 48	1.6 55	1.4 63	1.1 88					
460				3 20	2.3 31	2 41	1.7 49	1.6 57	1.4 64	1.1 90					
470				3 20	2.3 32	2 42	1.7 50	1.6 58	1.4 66	1.1 92					
480				3 21	2.3 33	2 43	1.7 51	1.6 59	1.4 67	1.1 94					
490				3 22	2.3 34	2 44	1.7 53	1.6 61	1.4 68	1.1 96					
500				3 22	2.3 35	2 45	1.7 54	1.6 62	1.4 70	1.1 98					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															0.6 11
40															0.6 16
50												1 11	0.8 13	0.7 18	0.6 21
60											1.1 10	0.9 14	0.8 17	0.7 22	0.6 26
70											1.1 13	0.9 17	0.8 20	0.7 26	0.6 31
80										1.3 10	1 16	0.9 20	0.8 24	0.7 30	0.6 35
90										1.3 13	1 18	0.9 23	0.8 27	0.7 34	0.6 40
100										1.3 15	1 21	0.9 26	0.8 30	0.7 38	0.6 45
110										1.2 17	1 24	0.9 29	0.8 34	0.7 42	0.6 50
120									1.7 10	1.2 19	1 26	0.9 32	0.8 37	0.7 46	0.6 54
130									1.6 12	1.2 22	1 29	0.9 35	0.8 40	0.7 50	0.6 59
140								1.8 10	1.6 13	1.2 24	1 31	0.9 38	0.8 44	0.7 54	0.6 64
150								1.8 12	1.6 15	1.2 26	1 34	0.9 41	0.8 47	0.7 58	0.6 68
160								1.8 13	1.6 17	1.2 28	1 36	0.9 44	0.8 51	0.7 63	0.6 73
170							2 10	1.7 15	1.6 19	1.2 30	1 39	0.9 47	0.8 54	0.7 67	0.6 78
180							2 12	1.7 16	1.6 20	1.2 32	1 41	0.9 50	0.8 57	0.7 71	0.6 82
190							1.9 13	1.7 18	1.6 22	1.2 34	1 44	0.9 53	0.8 61	0.7 75	0.6 87
200							1.9 15	1.7 19	1.5 23	1.2 36	1 47	0.9 56	0.8 64	0.7 79	0.6 92
210						2.3 10	1.9 16	1.7 21	1.5 25	1.2 38	1 49	0.9 59	0.8 67	0.7 83	0.6 96
220						2.2 11	1.9 18	1.7 22	1.5 27	1.2 40	1 52	0.9 62	0.8 71	0.7 87	
230						2.2 13	1.9 19	1.7 24	1.5 28	1.2 42	1 54	0.9 65	0.8 74	0.7 91	
240						2.2 14	1.9 20	1.7 25	1.5 30	1.1 44	1 57	0.8 67	0.8 77	0.7 95	
250						2.2 15	1.9 22	1.7 27	1.5 31	1.1 46	1 59	0.8 70	0.8 81	0.7 99	
260						2.1 17	1.8 23	1.6 28	1.5 33	1.1 49	1 62	0.8 73	0.8 84		
270						2.1 18	1.8 24	1.6 30	1.5 34	1.1 51	1 64	0.8 76	0.8 87		
280					2.6 10	2.1 19	1.8 25	1.6 31	1.5 36	1.1 53	1 67	0.8 79	0.8 91		
290					2.6 11	2.1 20	1.8 27	1.6 32	1.5 37	1.1 55	1 69	0.8 82	0.8 94		
300					2.6 13	2.1 21	1.8 28	1.6 34	1.5 39	1.1 57	1 72	0.8 85	0.8 97		
310					2.5 14	2.1 22	1.8 29	1.6 35	1.5 40	1.1 59	1 74	0.8 88			
320					2.5 15	2.1 24	1.8 30	1.6 37	1.5 42	1.1 61	1 77	0.8 91			
330					2.5 16	2.1 25	1.8 32	1.6 38	1.5 44	1.1 63	1 79	0.8 94			
340					2.5 17	2.1 26	1.8 33	1.6 39	1.5 45	1.1 65	1 82	0.8 97			
350					2.5 18	2.1 27	1.8 34	1.6 41	1.5 47	1.1 67	1 84	0.8 100			
360					2.5 19	2 28	1.8 35	1.6 42	1.5 48	1.1 69	1 87				
370					2.5 20	2 29	1.8 37	1.6 43	1.5 50	1.1 71	1 89				
380					2.4 21	2 30	1.8 38	1.6 45	1.5 51	1.1 73	1 92				
390					2.4 22	2 31	1.8 39	1.6 46	1.5 52	1.1 75	1 94				
400					2.4 23	2 32	1.8 40	1.6 47	1.5 54	1.1 77	1 97				
410				3.2 10	2.4 24	2 33	1.8 41	1.6 49	1.5 56	1.1 79	1 99				
420				3.2 11	2.4 25	2 35	1.8 43	1.6 50	1.5 57	1.1 81					
430				3.1 12	2.4 26	2 36	1.8 44	1.6 52	1.5 59	1.1 83					
440				3.1 13	2.4 27	2 37	1.8 45	1.6 53	1.5 60	1.1 85					
450				3.1 14	2.4 28	2 38	1.8 46	1.6 54	1.5 61	1.1 87					
460				3.1 15	2.4 29	2 39	1.8 48	1.6 56	1.4 63	1.1 89					
470				3.1 16	2.4 29	2 40	1.8 49	1.6 57	1.4 65	1.1 91					
480				3.1 17	2.4 30	2 41	1.8 50	1.6 58	1.4 66	1.1 93					
490				3 17	2.4 31	2 42	1.8 51	1.6 60	1.4 67	1.1 95					
500				3 18	2.4 32	2 43	1.8 52	1.6 61	1.4 69	1.1 97					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															0.8 10
50														0.9 10	0.7 13
60														0.8 13	0.7 16
70													1 12	0.8 15	0.7 18
80												1.1 11	1 14	0.8 18	0.7 21
90											1.3 10	1.1 13	1 16	0.8 20	0.7 24
100											1.3 11	1.1 15	1 18	0.8 23	0.7 27
110											1.3 13	1.1 16	1 20	0.8 25	0.7 30
120										1.6 10	1.3 14	1.1 18	1 22	0.8 28	0.7 33
130										1.5 11	1.3 16	1.1 20	1 24	0.8 30	0.7 36
140										1.5 12	1.2 17	1.1 22	0.9 26	0.8 32	0.7 39
150										1.5 14	1.2 19	1.1 23	0.9 28	0.8 35	0.7 41
160										1.5 15	1.2 20	1.1 25	0.9 30	0.8 37	0.7 44
170										1.5 16	1.2 22	1.1 27	0.9 31	0.8 40	0.7 47
180									2.1 10	1.5 17	1.2 23	1.1 29	0.9 33	0.8 42	0.7 50
190									2.1 10	1.5 18	1.2 25	1 30	0.9 35	0.8 45	0.7 53
200									2 11	1.5 20	1.2 26	1 32	0.9 37	0.8 47	0.7 56
210								2.3 10	2 12	1.5 21	1.2 28	1 34	0.9 39	0.8 49	0.7 58
220								2.3 10	2 13	1.5 22	1.2 29	1 35	0.9 41	0.8 52	0.7 61
230									2.2 11	1.5 23	1.2 31	1 37	0.9 43	0.8 54	0.7 64
240									2.2 12	1.5 24	1.2 32	1 39	0.9 45	0.8 57	0.7 67
250									2.2 13	1.5 25	1.2 33	1 41	0.9 47	0.8 59	0.7 70
260						2.5 10	2.2 14	2 17	1.5 27	1.2 35	1 42	0.9 49	0.8 62	0.7 73	
270						2.5 11	2.2 14	2 17	1.5 28	1.2 36	1 44	0.9 51	0.8 64	0.7 76	
280						2.5 12	2.2 15	2 18	1.5 29	1.2 38	1 46	0.9 53	0.8 66	0.7 78	
290						2.5 12	2.2 16	2 19	1.4 30	1.2 39	1 48	0.9 55	0.8 69	0.7 81	
300						2.5 13	2.2 17	2 20	1.4 31	1.2 41	1 49	0.9 57	0.8 71	0.7 84	
310						2.5 14	2.2 17	1.9 21	1.4 32	1.2 42	1 51	0.9 59	0.8 74	0.7 87	
320						2.9 10	2.5 14	2.2 18	1.9 22	1.4 33	1.2 44	1 53	0.9 61	0.8 76	0.7 90
330						2.9 10	2.5 15	2.2 19	1.9 22	1.4 35	1.2 45	1 54	0.9 63	0.8 79	0.7 93
340						2.9 11	2.4 16	2.2 20	1.9 23	1.4 36	1.2 46	1 56	0.9 65	0.8 81	0.7 96
350						2.9 12	2.4 16	2.1 20	1.9 24	1.4 37	1.2 48	1 58	0.9 67	0.8 83	0.7 99
360						2.9 12	2.4 17	2.1 21	1.9 25	1.4 38	1.2 49	1 59	0.9 69	0.8 86	
370						2.9 13	2.4 18	2.1 22	1.9 26	1.4 39	1.2 51	1 61	0.9 71	0.8 88	
380						2.8 13	2.4 18	2.1 23	1.9 27	1.4 40	1.2 52	1 63	0.9 73	0.8 91	
390						2.8 14	2.4 19	2.1 23	1.9 27	1.4 41	1.2 54	1 65	0.9 75	0.8 93	
400						2.8 15	2.4 20	2.1 24	1.9 28	1.4 43	1.2 55	1 66	0.9 77	0.8 96	
410						2.8 15	2.4 20	2.1 25	1.9 29	1.4 44	1.2 56	1 68	0.9 79	0.8 98	
420						2.8 16	2.4 21	2.1 26	1.9 30	1.4 45	1.2 58	1 70	0.9 81	0.8 100	
430					3.4 10	2.8 16	2.4 22	2.1 26	1.9 31	1.4 46	1.2 59	1 71	0.9 83		
440					3.4 10	2.8 17	2.4 22	2.1 27	1.9 31	1.4 47	1.2 61	1 73	0.9 85		
450					3.4 11	2.8 17	2.4 23	2.1 28	1.9 32	1.4 48	1.2 62	1 75	0.9 87		
460					3.4 11	2.8 18	2.4 24	2.1 28	1.9 33	1.4 49	1.2 64	1 77	0.9 88		
470					3.4 12	2.8 18	2.4 24	2.1 29	1.9 34	1.4 51	1.2 65	1 78	0.9 90		
480					3.4 12	2.8 19	2.4 25	2.1 30	1.9 35	1.4 52	1.2 67	1 80	0.9 92		
490					3.4 13	2.8 20	2.4 25	2.1 31	1.9 35	1.4 53	1.2 68	1 82	0.9 94		
500					3.4 13	2.8 20	2.4 26	2.1 31	1.9 36	1.4 54	1.2 69	1 83	0.9 96		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.7 12
60														0.9 12	0.7 15
70													1 10	0.8 14	0.7 18
80												1.2 10	1 13	0.8 17	0.7 21
90												1.1 12	1 15	0.8 19	0.7 24
100											1.3 10	1.1 14	1 17	0.8 22	0.7 27
110											1.3 12	1.1 15	1 19	0.8 24	0.7 29
120											1.3 13	1.1 17	1 21	0.8 27	0.7 32
130											1.3 15	1.1 19	1 23	0.8 29	0.7 35
140										1.6 10	1.3 16	1.1 21	1 25	0.8 32	0.7 38
150										1.6 12	1.3 18	1.1 23	1 27	0.8 34	0.7 41
160										1.5 13	1.3 19	1.1 24	0.9 29	0.8 37	0.7 44
170										1.5 14	1.2 21	1.1 26	0.9 31	0.8 39	0.7 47
180										1.5 16	1.2 22	1.1 28	0.9 33	0.8 42	0.7 49
190										1.5 17	1.2 24	1.1 29	0.9 35	0.8 44	0.7 52
200										1.5 18	1.2 25	1.1 31	0.9 37	0.8 46	0.7 55
210										1.5 19	1.2 27	1.1 33	0.9 39	0.8 49	0.7 58
220									2.1 10	1.5 20	1.2 28	1 35	0.9 41	0.8 51	0.7 61
230									2.1 11	1.5 22	1.2 30	1 36	0.9 43	0.8 54	0.7 64
240									2 12	1.5 23	1.2 31	1 38	0.9 45	0.8 56	0.7 67
250								2.3 10	2 13	1.5 24	1.2 32	1 40	0.9 47	0.8 59	0.7 69
260								2.3 10	2 14	1.5 25	1.2 34	1 42	0.9 49	0.8 61	0.7 72
270								2.3 11	2 15	1.5 26	1.2 35	1 43	0.9 50	0.8 64	0.7 75
280								2.3 12	2 16	1.5 28	1.2 37	1 45	0.9 53	0.8 66	0.7 78
290								2.2 13	2 17	1.5 29	1.2 38	1 47	0.9 55	0.8 68	0.7 81
300								2.2 14	2 18	1.5 30	1.2 40	1 48	0.9 56	0.8 71	0.7 84
310							2.6 10	2.2 15	2 19	1.5 31	1.2 41	1 50	0.9 58	0.8 73	0.7 87
320							2.5 11	2.2 16	2 20	1.5 32	1.2 43	1 52	0.9 60	0.8 76	0.7 89
330							2.5 12	2.2 16	2 20	1.4 33	1.2 44	1 54	0.9 62	0.8 78	0.7 92
340							2.5 12	2.2 17	2 21	1.4 35	1.2 46	1 55	0.9 64	0.8 81	0.7 95
350							2.5 13	2.2 18	2 22	1.4 36	1.2 47	1 57	0.9 66	0.8 83	0.7 98
360							2.5 14	2.2 19	1.9 23	1.4 37	1.2 48	1 59	0.9 68	0.8 85	
370							2.5 15	2.2 20	1.9 24	1.4 38	1.2 50	1 60	0.9 70	0.8 88	
380							2.5 15	2.2 20	1.9 25	1.4 39	1.2 51	1 62	0.9 72	0.8 90	
390						2.9 10	2.5 16	2.2 21	1.9 26	1.4 40	1.2 53	1 64	0.9 74	0.8 93	
400						2.9 10	2.5 17	2.2 22	1.9 26	1.4 42	1.2 54	1 66	0.9 76	0.8 95	
410						2.9 11	2.4 17	2.1 23	1.9 27	1.4 43	1.2 56	1 67	0.9 78	0.8 98	
420						2.9 12	2.4 18	2.1 23	1.9 28	1.4 44	1.2 57	1 69	0.9 80	0.8 100	
430						2.9 12	2.4 19	2.1 24	1.9 29	1.4 45	1.2 59	1 71	0.9 82		
440						2.9 13	2.4 20	2.1 25	1.9 30	1.4 46	1.2 60	1 72	0.9 84		
450						2.9 14	2.4 20	2.1 26	1.9 31	1.4 47	1.2 61	1 74	0.9 86		
460						2.8 14	2.4 21	2.1 26	1.9 31	1.4 48	1.2 63	1 76	0.9 88		
470						2.8 15	2.4 22	2.1 27	1.9 32	1.4 50	1.2 64	1 78	0.9 90		
480						2.8 16	2.4 22	2.1 28	1.9 33	1.4 51	1.2 66	1 79	0.9 92		
490						2.8 16	2.4 23	2.1 29	1.9 34	1.4 52	1.2 67	1 81	0.9 94		
500						2.8 17	2.4 24	2.1 29	1.9 35	1.4 53	1.2 69	1 83	0.9 96		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 11
60														0.9 11	0.7 14
70														0.9 14	0.7 17
80													1 11	0.8 16	0.7 20
90												1.2 10	1 14	0.8 19	0.7 23
100												1.2 12	1 16	0.8 21	0.7 26
110											1.4 10	1.1 14	1 18	0.8 24	0.7 29
120											1.3 11	1.1 16	1 20	0.8 26	0.7 32
130											1.3 13	1.1 18	1 22	0.8 29	0.7 35
140											1.3 15	1.1 20	1 24	0.8 31	0.7 37
150											1.3 16	1.1 21	1 26	0.8 34	0.7 40
160										1.6 11	1.3 18	1.1 23	1 28	0.8 36	0.7 43
170										1.6 12	1.3 19	1.1 25	1 30	0.8 39	0.7 46
180										1.6 14	1.3 21	1.1 27	0.9 32	0.8 41	0.7 49
190										1.5 15	1.2 22	1.1 29	0.9 34	0.8 43	0.7 52
200										1.5 16	1.2 24	1.1 30	0.9 36	0.8 46	0.7 55
210										1.5 18	1.2 25	1.1 32	0.9 38	0.8 48	0.7 58
220										1.5 19	1.2 27	1.1 34	0.9 40	0.8 51	0.7 60
230										1.5 20	1.2 28	1.1 36	0.9 42	0.8 53	0.7 63
240										1.5 21	1.2 30	1.1 37	0.9 44	0.8 56	0.7 66
250								2.1 10	1.5 23	1.2 31	1 39	0.9 46	0.8 58	0.7 69	
260								2.1 11	1.5 24	1.2 33	1 41	0.9 48	0.8 61	0.7 72	
270								2.1 12	1.5 25	1.2 34	1 43	0.9 50	0.8 63	0.7 75	
280								2.1 13	1.5 26	1.2 36	1 44	0.9 52	0.8 65	0.7 78	
290								2 14	1.5 27	1.2 37	1 46	0.9 54	0.8 68	0.7 80	
300								2.3 10	1.5 29	1.2 39	1 48	0.9 56	0.8 70	0.7 83	
310								2.3 11	1.5 30	1.2 40	1 49	0.9 58	0.8 73	0.7 86	
320								2.3 12	1.5 31	1.2 42	1 51	0.9 60	0.8 75	0.7 89	
330								2.3 13	1.5 32	1.2 43	1 53	0.9 62	0.8 78	0.7 92	
340								2.3 14	1.5 33	1.2 45	1 55	0.9 64	0.8 80	0.7 95	
350								2.2 15	1.5 35	1.2 46	1 56	0.9 66	0.8 83	0.7 98	
360						2.6 10	2.2 16	2 21	1.5 36	1.2 48	1 58	0.9 68	0.8 85	0.7 100	
370						2.6 10	2.2 17	2 22	1.4 37	1.2 49	1 60	0.9 70	0.8 87		
380						2.6 11	2.2 18	2 23	1.4 38	1.2 50	1 61	0.9 72	0.8 90		
390						2.5 12	2.2 19	2 24	1.4 39	1.2 52	1 63	0.9 74	0.8 92		
400						2.5 13	2.2 20	2 25	1.4 40	1.2 53	1 65	0.9 76	0.8 95		
410						2.5 14	2.2 21	1.9 25	1.4 41	1.2 55	1 67	0.9 77	0.8 97		
420						2.5 15	2.2 22	1.9 26	1.4 43	1.2 56	1 68	0.9 79	0.8 100		
430						2.5 15	2.2 22	1.9 27	1.4 44	1.2 58	1 70	0.9 81			
440						2.5 16	2.2 22	1.9 28	1.4 45	1.2 59	1 72	0.9 83			
450						2.5 17	2.2 23	1.9 29	1.4 46	1.2 61	1 73	0.9 85			
460						2.5 18	2.2 24	1.9 29	1.4 47	1.2 62	1 75	0.9 87			
470						2.9 10	2.5 18	2.1 25	1.9 30	1.4 48	1 77	0.9 89			
480						2.9 11	2.4 19	2.1 26	1.9 31	1.4 50	1 79	0.9 91			
490						2.9 12	2.4 20	2.1 26	1.9 32	1.4 51	1 80	0.9 93			
500						2.9 12	2.4 21	2.1 27	1.9 33	1.4 52	1 82	0.9 95			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 10
60															0.8 12
70														1 10	0.8 14
80														1 11	0.8 16
90													1.2 10	1 13	0.8 18
100													1.2 11	0.9 15	0.8 20
110												1.3 10	1.1 12	0.9 17	0.8 22
120												1.3 11	1.1 14	0.9 18	0.8 24
130												1.3 12	1.1 15	0.9 20	0.8 26
140											1.5 10	1.3 14	1.1 17	0.9 22	0.8 28
150											1.5 11	1.3 15	1.1 18	0.9 24	0.8 30
160											1.5 12	1.3 16	1.1 19	0.9 25	0.8 32
170											1.5 13	1.3 17	1.1 21	0.9 27	0.8 34
180											1.5 14	1.3 18	1.1 22	0.9 29	0.8 36
190										1.9 10	1.5 15	1.2 20	1.1 23	0.9 30	0.8 38
200										1.8 11	1.5 16	1.2 21	1.1 25	0.9 32	0.8 40
210										1.8 12	1.5 17	1.2 22	1.1 26	0.9 34	0.8 42
220										1.8 12	1.5 18	1.2 23	1.1 27	0.9 35	0.8 44
230										1.8 13	1.4 19	1.2 24	1.1 29	0.9 37	0.8 46
240										1.8 14	1.4 20	1.2 25	1.1 30	0.9 39	0.8 48
250										1.8 15	1.4 21	1.2 27	1.1 32	0.9 41	0.8 50
260										1.8 16	1.4 22	1.2 28	1.1 33	0.9 42	0.8 52
270										1.8 16	1.4 23	1.2 29	1.1 34	0.9 44	0.8 54
280										1.8 17	1.4 24	1.2 30	1.1 36	0.9 46	0.8 56
290										1.8 18	1.4 25	1.2 31	1.1 37	0.9 47	0.8 58
300									2.5 10	1.8 19	1.4 26	1.2 32	1.1 38	0.9 49	0.8 60
310									2.5 10	1.8 20	1.4 27	1.2 34	1.1 40	0.9 51	0.8 62
320									2.5 11	1.8 20	1.4 28	1.2 35	1.1 41	0.9 52	0.8 64
330									2.5 11	1.8 21	1.4 29	1.2 36	1.1 42	0.9 54	0.8 66
340									2.5 12	1.8 22	1.4 30	1.2 37	1.1 44	0.9 56	0.8 69
350									2.5 13	1.8 23	1.4 31	1.2 38	1.1 45	0.9 58	0.8 70
360								2.8 10	2.5 13	1.8 23	1.4 32	1.2 39	1.1 46	0.9 59	0.8 72
370								2.8 10	2.5 14	1.8 24	1.4 33	1.2 41	1.1 48	0.9 61	0.8 74
380								2.8 11	2.4 14	1.7 25	1.4 34	1.2 42	1.1 49	0.9 63	0.8 76
390								2.8 11	2.4 15	1.7 26	1.4 35	1.2 43	1.1 51	0.9 64	0.8 78
400								2.7 12	2.4 15	1.7 26	1.4 36	1.2 44	1.1 52	0.9 66	0.8 80
410								2.7 12	2.4 16	1.7 27	1.4 37	1.2 45	1.1 53	0.9 68	0.8 82
420								2.7 13	2.4 16	1.7 28	1.4 38	1.2 46	1.1 55	0.9 69	0.8 84
430								2.7 13	2.4 17	1.7 29	1.4 39	1.2 48	1.1 56	0.9 71	0.8 86
440							3.1 10	2.7 14	2.4 18	1.7 30	1.4 40	1.2 49	1.1 57	0.9 73	0.8 89
450							3.1 10	2.7 14	2.4 18	1.7 30	1.4 41	1.2 50	1.1 59	0.9 74	0.8 91
460							3.1 11	2.7 15	2.4 19	1.7 31	1.4 42	1.2 51	1.1 60	0.9 76	0.8 93
470							3.1 11	2.7 15	2.4 19	1.7 32	1.4 43	1.2 52	1.1 61	0.9 78	0.8 95
480							3.1 12	2.7 16	2.4 20	1.7 33	1.4 44	1.2 53	1.1 63	0.9 79	0.8 97
490							3.1 12	2.7 16	2.4 20	1.7 33	1.4 45	1.2 55	1.1 64	0.9 81	0.8 99
500							3.1 13	2.7 17	2.4 21	1.7 34	1.4 45	1.2 56	1.1 65	0.9 83	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.8 10
60															0.8 12
70															0.8 14
80														1 11	0.8 16
90														1 12	0.8 18
100													1.2 10	1 14	0.8 20
110													1.2 11	1 16	0.8 22
120													1.2 13	0.9 18	0.8 24
130												1.3 11	1.1 14	0.9 19	0.8 26
140												1.3 12	1.1 15	0.9 21	0.8 28
150												1.3 13	1.1 17	0.9 23	0.8 30
160											1.5 10	1.3 15	1.1 18	0.9 25	0.8 32
170											1.5 11	1.3 16	1.1 20	0.9 26	0.8 34
180											1.5 12	1.3 17	1.1 21	0.9 28	0.8 36
190											1.5 14	1.3 18	1.1 23	0.9 30	0.8 38
200											1.5 15	1.3 20	1.1 24	0.9 31	0.8 40
210											1.5 16	1.3 21	1.1 25	0.9 33	0.8 42
220										1.9 10	1.5 17	1.2 22	1.1 27	0.9 35	0.8 44
230										1.9 11	1.5 18	1.2 23	1.1 28	0.9 37	0.8 46
240										1.9 12	1.5 19	1.2 24	1.1 29	0.9 38	0.8 48
250										1.8 13	1.5 20	1.2 26	1.1 31	0.9 40	0.8 50
260										1.8 14	1.4 21	1.2 27	1.1 32	0.9 42	0.8 52
270										1.8 14	1.4 22	1.2 28	1.1 33	0.9 43	0.8 54
280										1.8 15	1.4 23	1.2 29	1.1 35	0.9 45	0.8 56
290										1.8 16	1.4 24	1.2 30	1.1 36	0.9 47	0.8 58
300										1.8 17	1.4 25	1.2 32	1.1 38	0.9 48	0.8 60
310										1.8 18	1.4 26	1.2 33	1.1 39	0.9 50	0.8 62
320										1.8 19	1.4 27	1.2 34	1.1 40	0.9 52	0.8 64
330										1.8 19	1.4 28	1.2 35	1.1 42	0.9 54	0.8 66
340										1.8 20	1.4 29	1.2 36	1.1 43	0.9 55	0.8 68
350										1.8 21	1.4 30	1.2 37	1.1 44	0.9 57	0.8 70
360								2.5 10	1.8 22	1.4 31	1.2 39	1.1 46	0.9 59	0.8 72	
370								2.5 10	1.8 23	1.4 32	1.2 40	1.1 47	0.9 60	0.8 74	
380								2.5 11	1.8 23	1.4 33	1.2 41	1.1 48	0.9 62	0.8 76	
390								2.5 12	1.8 24	1.4 34	1.2 42	1.1 50	0.9 64	0.8 78	
400								2.5 12	1.8 25	1.4 35	1.2 43	1.1 51	0.9 65	0.8 80	
410								2.5 13	1.8 26	1.4 36	1.2 44	1.1 53	0.9 67	0.8 82	
420								2.5 13	1.7 26	1.4 37	1.2 46	1.1 54	0.9 69	0.8 84	
430								2.8 10	2.5 14	1.7 27	1.4 38	1.2 47	1.1 55	0.9 71	0.8 86
440								2.8 10	2.5 15	1.7 28	1.4 39	1.2 48	1.1 57	0.9 72	0.8 88
450								2.8 11	2.4 15	1.7 29	1.4 40	1.2 49	1.1 58	0.9 74	0.8 90
460								2.8 11	2.4 16	1.7 30	1.4 41	1.2 50	1.1 59	0.9 76	0.8 92
470								2.8 12	2.4 16	1.7 30	1.4 42	1.2 52	1.1 61	0.9 77	0.8 94
480								2.8 12	2.4 17	1.7 31	1.4 43	1.2 53	1.1 62	0.9 79	0.8 96
490								2.7 13	2.4 18	1.7 32	1.4 44	1.2 54	1.1 63	0.9 81	0.8 98
500								2.7 13	2.4 18	1.7 33	1.4 44	1.2 55	1.1 65	0.9 82	0.8 100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															0.8 11
70															0.8 13
80														1 10	0.8 15
90														1 12	0.8 17
100														1 13	0.8 19
110														1 15	0.8 21
120													1.2 11	1 17	0.8 23
130													1.2 13	1 18	0.8 25
140												1.3 10	1.2 14	0.9 20	0.8 27
150												1.3 12	1.2 16	0.9 22	0.8 29
160												1.3 13	1.1 17	0.9 24	0.8 31
170												1.3 14	1.1 19	0.9 25	0.8 33
180											1.6 10	1.3 16	1.1 20	0.9 27	0.8 35
190											1.5 11	1.3 17	1.1 21	0.9 29	0.8 37
200											1.5 13	1.3 18	1.1 23	0.9 31	0.8 39
210											1.5 14	1.3 19	1.1 24	0.9 32	0.8 41
220											1.5 15	1.3 21	1.1 26	0.9 34	0.8 44
230											1.5 16	1.3 22	1.1 27	0.9 36	0.8 46
240											1.5 17	1.3 23	1.1 28	0.9 38	0.8 47
250										1.9 10	1.5 18	1.2 24	1.1 30	0.9 39	0.8 49
260										1.9 11	1.5 19	1.2 26	1.1 31	0.9 41	0.8 52
270										1.9 12	1.5 20	1.2 27	1.1 33	0.9 43	0.8 54
280										1.9 13	1.5 21	1.2 28	1.1 34	0.9 44	0.8 56
290										1.9 14	1.5 22	1.2 29	1.1 35	0.9 46	0.8 58
300										1.8 14	1.4 23	1.2 30	1.1 37	0.9 48	0.8 60
310										1.8 15	1.4 24	1.2 32	1.1 38	0.9 50	0.8 62
320										1.8 16	1.4 25	1.2 33	1.1 39	0.9 51	0.8 64
330										1.8 17	1.4 26	1.2 34	1.1 41	0.9 53	0.8 65
340										1.8 18	1.4 27	1.2 35	1.1 42	0.9 55	0.8 67
350										1.8 19	1.4 28	1.2 36	1.1 44	0.9 56	0.8 70
360										1.8 20	1.4 29	1.2 38	1.1 45	0.9 58	0.8 72
370										1.8 21	1.4 31	1.2 39	1.1 46	0.9 60	0.8 74
380										1.8 21	1.4 32	1.2 40	1.1 48	0.9 61	0.8 76
390										1.8 22	1.4 32	1.2 41	1.1 49	0.9 63	0.8 78
400										1.8 23	1.4 34	1.2 42	1.1 50	0.9 65	0.8 80
410										1.8 24	1.4 34	1.2 44	1.1 52	0.9 67	0.8 82
420										1.8 25	1.4 36	1.2 45	1.1 53	0.9 68	0.8 84
430									2.5 10	1.8 25	1.4 36	1.2 46	1.1 55	0.9 70	0.8 86
440									2.5 11	1.8 26	1.4 37	1.2 47	1.1 56	0.9 72	0.8 88
450									2.5 11	1.8 27	1.4 38	1.2 48	1.1 57	0.9 73	0.8 90
460									2.5 12	1.8 28	1.4 39	1.2 50	1.1 59	0.9 75	0.8 92
470									2.5 13	1.8 29	1.4 40	1.2 51	1.1 60	0.9 77	0.8 94
480									2.5 13	1.7 29	1.4 41	1.2 52	1.1 61	0.9 78	0.8 96
490									2.5 14	1.7 30	1.4 42	1.2 53	1.1 63	0.9 80	0.8 98
500									2.5 15	1.7 31	1.4 43	1.2 54	1.1 64	0.9 82	0.8 100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10										0.5 11					
20					0.9 11	0.8 13	0.7 15	0.6 17	0.6 19						
30				1 14	0.8 18	0.7 21	0.7 24	0.6 27	0.6 29						
40			1.3 13	1 20	0.8 25	0.7 29	0.7 33	0.6 36	0.6 39						
50			1.2 18	1 25	0.8 31	0.7 37	0.7 41	0.6 46	0.6 50						
60			1.2 22	1 31	0.8 38	0.7 44	0.7 50	0.6 55	0.6 60						
70		2 13	1.2 27	0.9 37	0.8 45	0.7 52	0.7 59	0.6 65	0.6 70						
80		1.9 16	1.2 31	0.9 42	0.8 52	0.7 60	0.7 67	0.6 74	0.6 81						
90		1.9 19	1.2 36	0.9 48	0.8 59	0.7 68	0.7 76	0.6 84	0.6 91						
100		1.8 21	1.2 40	0.9 54	0.8 65	0.7 76	0.7 85	0.6 93							
110		1.8 24	1.2 45	0.9 60	0.8 72	0.7 83									
120		1.8 27	1.2 49	0.9 65	0.8 79	0.7 91									
130		1.8 30	1.2 53	0.9 71	0.8 86	0.7 99									
140		1.8 33	1.2 58	0.9 77	0.8 93										
150		1.8 35	1.2 62	0.9 82	0.8 99										
160		1.8 38	1.2 66	0.9 88											
170	3.6 11	1.8 41	1.2 71	0.9 93											
180	3.6 13	1.7 44	1.2 75	0.9 99											
190	3.5 15	1.7 46	1.1 79												
200	3.5 16	1.7 49	1.1 84												
210	3.4 18	1.7 52	1.1 88												
220	3.4 19	1.7 55	1.1 92												
230	3.4 21	1.7 57	1.1 97												
240	3.3 22	1.7 60													
250	3.3 24	1.7 63													
260	3.3 25	1.7 65													
270	3.3 27	1.7 68													
280	3.3 28	1.7 71													
290	3.3 30	1.7 74													
300	3.2 31	1.7 76													
310	3.2 33	1.7 79													
320	3.2 34	1.7 82													
330	3.2 35	1.7 84													
340	3.2 37	1.7 87													
350	3.2 38	1.7 90													
360	3.2 40	1.7 93													
370	3.2 41	1.7 95													
380	3.2 43	1.7 98													
390	3.1 44														
400	3.1 45														
410	3.1 47														
420	3.1 48														
430	3.1 50														
440	3.1 51														
450	3.1 52														
460	3.1 54														
470	3.1 55														
480	3.1 56														
490	3.1 58														
500	3.1 59														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10										0.5 11					
20						0.8 12	0.7 14	0.6 16	0.6 18						
30				1.1 12	0.9 17	0.8 20	0.7 23	0.6 26	0.6 29						
40			1.3 11	1 18	0.8 24	0.7 28	0.7 32	0.6 36	0.6 39						
50			1.3 16	1 24	0.8 30	0.7 36	0.7 41	0.6 45	0.6 49						
60			1.2 21	1 30	0.8 37	0.7 44	0.7 49	0.6 55	0.6 60						
70			1.2 25	1 36	0.8 44	0.7 52	0.7 58	0.6 64	0.6 70						
80		2 12	1.2 30	0.9 41	0.8 51	0.7 59	0.7 67	0.6 74	0.6 80						
90		2 15	1.2 34	0.9 47	0.8 58	0.7 67	0.7 76	0.6 83	0.6 90						
100		1.9 18	1.2 39	0.9 53	0.8 65	0.7 75	0.7 84	0.6 93							
110		1.9 22	1.2 43	0.9 59	0.8 71	0.7 83	0.7 93								
120		1.8 24	1.2 48	0.9 64	0.8 78	0.7 90									
130		1.8 27	1.2 52	0.9 70	0.8 85	0.7 98									
140		1.8 30	1.2 56	0.9 76	0.8 92										
150		1.8 33	1.2 61	0.9 81	0.8 99										
160		1.8 36	1.2 65	0.9 87											
170		1.8 39	1.2 69	0.9 93											
180		1.8 42	1.2 74	0.9 98											
190		1.8 44	1.2 78												
200		1.8 47	1.2 83												
210	3.7 10	1.7 50	1.2 87												
220	3.7 12	1.7 53	1.1 91												
230	3.6 14	1.7 55	1.1 96												
240	3.6 16	1.7 58	1.1 100												
250	3.5 17	1.7 61													
260	3.5 19	1.7 64													
270	3.4 21	1.7 66													
280	3.4 23	1.7 69													
290	3.4 24	1.7 72													
300	3.4 26	1.7 75													
310	3.3 27	1.7 77													
320	3.3 29	1.7 80													
330	3.3 31	1.7 83													
340	3.3 32	1.7 85													
350	3.3 34	1.7 88													
360	3.2 35	1.7 91													
370	3.2 37	1.7 94													
380	3.2 38	1.7 96													
390	3.2 40	1.7 99													
400	3.2 41														
410	3.2 43														
420	3.2 44														
430	3.2 45														
440	3.2 47														
450	3.2 48														
460	3.1 50														
470	3.1 51														
480	3.1 53														
490	3.1 54														
500	3.1 55														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10						0.8 11	0.7 13	0.7 15	0.6 17	0.5 10					
20						0.8 19	0.7 22	0.6 25	0.6 28						
30				1.1 10	0.9 15	0.7 27	0.7 31	0.6 35	0.6 38						
40				1 17	0.8 22	0.7 35	0.7 40	0.6 45	0.6 49						
50			1.3 14	1 23	0.8 30	0.7 43	0.7 49	0.6 54	0.6 59						
60			1.3 19	1 29	0.8 36	0.7 51	0.7 58	0.6 64	0.6 69						
70			1.3 24	1 35	0.8 43	0.7 59	0.7 66	0.6 73	0.6 80						
80			1.2 28	1 40	0.8 50	0.7 66	0.7 75	0.6 83	0.6 90						
90		2.1 10	1.2 33	0.9 46	0.8 57	0.7 74	0.7 84	0.6 92	0.6 100						
100		2 14	1.2 37	0.9 52	0.8 64	0.7 82	0.7 92								
110		2 18	1.2 42	0.9 58	0.8 71										
120		1.9 21	1.2 46	0.9 63	0.8 77	0.7 90									
130		1.9 24	1.2 51	0.9 69	0.8 84	0.7 98									
140		1.9 27	1.2 55	0.9 75	0.8 91										
150		1.8 30	1.2 60	0.9 80	0.8 98										
160		1.8 33	1.2 64	0.9 86											
170		1.8 36	1.2 68	0.9 92											
180		1.8 39	1.2 73	0.9 97											
190		1.8 42	1.2 77												
200		1.8 45	1.2 81												
210		1.8 48	1.2 86												
220		1.8 51	1.2 90												
230		1.8 53	1.2 95												
240		1.7 56	1.2 99												
250		1.7 59													
260	3.8 10	1.7 62													
270	3.7 12	1.7 64													
280	3.7 14	1.7 67													
290	3.6 16	1.7 70													
300	3.6 18	1.7 73													
310	3.5 20	1.7 75													
320	3.5 22	1.7 78													
330	3.4 24	1.7 81													
340	3.4 26	1.7 84													
350	3.4 28	1.7 86													
360	3.4 29	1.7 89													
370	3.3 31	1.7 92													
380	3.3 33	1.7 95													
390	3.3 34	1.7 97													
400	3.3 36	1.7 100													
410	3.3 37														
420	3.3 39														
430	3.2 41														
440	3.2 42														
450	3.2 44														
460	3.2 45														
470	3.2 47														
480	3.2 48														
490	3.2 50														
500	3.2 51														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40					1 11	0.9 14	0.8 16	0.7 18	0.7 20	0.5 26					
50			1.6 10	1.2 16	1 21	0.8 25	0.8 28	0.7 31	0.6 34	0.5 45					
60			1.5 13	1.1 20	0.9 25	0.8 30	0.7 34	0.7 38	0.6 42	0.5 54					
70			1.5 16	1.1 24	0.9 30	0.8 36	0.7 40	0.7 45	0.6 49	0.5 64					
80			1.4 19	1.1 28	0.9 35	0.8 41	0.7 46	0.7 52	0.6 56	0.5 73					
90			1.4 22	1.1 32	0.9 40	0.8 46	0.7 53	0.7 58	0.6 64	0.5 82					
100		2.4 10	1.4 25	1.1 36	0.9 44	0.8 52	0.7 59	0.7 65	0.6 71	0.5 91					
110		2.4 12	1.4 28	1.1 39	0.9 49	0.8 57	0.7 65	0.7 72	0.6 78						
120		2.3 14	1.4 31	1.1 43	0.9 54	0.8 63	0.7 71	0.7 78	0.6 85						
130		2.3 16	1.4 34	1.1 47	0.9 58	0.8 68	0.7 77	0.7 85	0.6 93						
140		2.2 18	1.4 37	1.1 51	0.9 63	0.8 74	0.7 83	0.7 92	0.6 100						
150		2.2 20	1.4 40	1.1 55	0.9 68	0.8 79	0.7 89	0.7 98							
160		2.2 22	1.4 43	1.1 59	0.9 72	0.8 84	0.7 95								
170		2.2 24	1.4 46	1.1 63	0.9 77	0.8 90									
180		2.2 25	1.4 49	1.1 67	0.9 82	0.8 95									
190		2.2 27	1.4 52	1.1 71	0.9 86										
200		2.1 29	1.3 55	1.1 74	0.9 91										
210		2.1 31	1.3 58	1.1 78	0.9 96										
220		2.1 33	1.3 61	1.1 82											
230		2.1 34	1.3 64	1.1 86											
240		2.1 36	1.3 67	1.1 90											
250		2.1 38	1.3 69	1.1 94											
260		2.1 40	1.3 72	1.1 98											
270		2.1 42	1.3 75												
280		2.1 44	1.3 78												
290	4.5 10	2.1 45	1.3 81												
300	4.5 11	2.1 47	1.3 84												
310	4.5 12	2.1 49	1.3 87												
320	4.4 13	2.1 51	1.3 90												
330	4.4 14	2.1 52	1.3 93												
340	4.4 15	2.1 54	1.3 96												
350	4.3 16	2.1 56	1.3 99												
360	4.3 17	2.1 58													
370	4.3 18	2.1 60													
380	4.3 19	2.1 61													
390	4.2 20	2.1 63													
400	4.2 21	2.1 65													
410	4.2 22	2.1 67													
420	4.2 23	2 68													
430	4.2 24	2 70													
440	4.2 25	2 72													
450	4.1 26	2 74													
460	4.1 27	2 75													
470	4.1 27	2 77													
480	4.1 28	2 79													
490	4.1 29	2 81													
500	4.1 30	2 83													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10															0.8	10	0.7	11	0.5	16										
20															0.7	17	0.7	19	0.5	26										
30											0.9	12	0.8	15	0.7	21	0.7	24	0.5	35										
40							1.2	10	1	14	0.9	18	0.8	21	0.7	24	0.7	26	0.5	35										
50							1.2	14	1	19	0.8	24	0.8	27	0.7	31	0.6	34	0.5	44										
60					1.6	10	1.2	18	1	24	0.8	29	0.8	34	0.7	37	0.6	41	0.5	54										
70					1.5	14	1.1	22	0.9	29	0.8	35	0.7	40	0.7	44	0.6	48	0.5	63										
80					1.5	17	1.1	26	0.9	34	0.8	40	0.7	46	0.7	51	0.6	56	0.5	72										
90					1.5	20	1.1	30	0.9	39	0.8	46	0.7	52	0.7	58	0.6	63	0.5	82										
100					1.4	23	1.1	34	0.9	43	0.8	51	0.7	58	0.7	64	0.6	70	0.5	91										
110					1.4	26	1.1	38	0.9	48	0.8	56	0.7	64	0.7	71	0.6	78	0.5	100										
120					1.4	29	1.1	42	0.9	53	0.8	62	0.7	70	0.7	78	0.6	85												
130		2.4	11	1.4	32	1.1	46	0.9	57	0.8	67	0.7	76	0.7	84	0.6	92													
140		2.4	14	1.4	36	1.1	50	0.9	62	0.8	73	0.7	82	0.7	91	0.6	99													
150		2.3	16	1.4	38	1.1	54	0.9	67	0.8	78	0.7	88	0.7	98															
160		2.3	18	1.4	41	1.1	58	0.9	72	0.8	84	0.7	94																	
170		2.3	20	1.4	44	1.1	62	0.9	76	0.8	89	0.7	100																	
180		2.2	22	1.4	48	1.1	66	0.9	81	0.8	94																			
190		2.2	24	1.4	50	1.1	70	0.9	86	0.8	100																			
200		2.2	26	1.4	53	1.1	73	0.9	90																					
210		2.2	28	1.4	56	1.1	77	0.9	95																					
220		2.2	30	1.4	59	1.1	81	0.9	100																					
230		2.2	32	1.3	62	1.1	85																							
240		2.1	34	1.3	65	1.1	89																							
250		2.1	35	1.3	68	1.1	93																							
260		2.1	37	1.3	71	1.1	97																							
270		2.1	39	1.3	74																									
280		2.1	41	1.3	77																									
290		2.1	43	1.3	80																									
300		2.1	45	1.3	83																									
310		2.1	47	1.3	86																									
320		2.1	48	1.3	89																									
330		2.1	50	1.3	92																									
340		2.1	52	1.3	95																									
350		2.1	54	1.3	98																									
360		2.1	56	1.3	100																									
370		2.1	57																											
380	4.6	10	2.1	59																										
390	4.6	11	2.1	61																										
400	4.5	12	2.1	63																										
410	4.5	13	2.1	64																										
420	4.5	14	2.1	66																										
430	4.4	15	2.1	68																										
440	4.4	17	2.1	70																										
450	4.4	18	2.1	72																										
460	4.3	19	2.1	73																										
470	4.3	20	2	75																										
480	4.3	21	2	77																										
490	4.3	22	2	79																										
500	4.3	23	2	80																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20									0.7 10	0.6 16					
30									0.7 18	0.5 25					
40					1 13	0.9 17	0.8 20	0.7 23	0.7 26	0.5 35					
50				1.2 12	1 18	0.9 23	0.8 26	0.7 30	0.7 33	0.5 44					
60				1.2 16	1 23	0.8 28	0.8 33	0.7 37	0.6 40	0.5 53					
70			1.6 10	1.2 21	1 28	0.8 34	0.7 39	0.7 43	0.6 48	0.5 63					
80			1.5 14	1.1 25	0.9 33	0.8 39	0.7 45	0.7 50	0.6 55	0.5 72					
90			1.5 18	1.1 29	0.9 37	0.8 45	0.7 51	0.7 57	0.6 62	0.5 81					
100			1.5 21	1.1 33	0.9 42	0.8 50	0.7 57	0.7 64	0.6 70	0.5 90					
110			1.4 24	1.1 37	0.9 47	0.8 56	0.7 63	0.7 70	0.6 77	0.5 100					
120			1.4 27	1.1 41	0.9 52	0.8 61	0.7 69	0.7 77	0.6 84						
130			1.4 31	1.1 45	0.9 56	0.8 66	0.7 76	0.7 84	0.6 92						
140			1.4 34	1.1 49	0.9 61	0.8 72	0.7 82	0.7 90	0.6 99						
150		2.5 10	1.4 37	1.1 53	0.9 66	0.8 77	0.7 88	0.7 97							
160		2.4 13	1.4 40	1.1 57	0.9 71	0.8 83	0.7 94								
170		2.4 15	1.4 43	1.1 61	0.9 75	0.8 88	0.7 100								
180		2.3 18	1.4 46	1.1 65	0.9 80	0.8 94									
190		2.3 20	1.4 49	1.1 68	0.9 85	0.8 99									
200		2.3 22	1.4 52	1.1 72	0.9 89										
210		2.3 24	1.4 55	1.1 76	0.9 94										
220		2.2 26	1.4 58	1.1 80	0.9 99										
230		2.2 28	1.4 61	1.1 84											
240		2.2 30	1.4 64	1.1 88											
250		2.2 32	1.4 67	1.1 92											
260		2.2 34	1.3 70	1.1 96											
270		2.2 36	1.3 73	1.1 100											
280		2.1 38	1.3 76												
290		2.1 40	1.3 79												
300		2.1 42	1.3 82												
310		2.1 44	1.3 85												
320		2.1 46	1.3 87												
330		2.1 47	1.3 90												
340		2.1 49	1.3 93												
350		2.1 51	1.3 96												
360		2.1 53	1.3 99												
370		2.1 55													
380		2.1 57													
390		2.1 59													
400		2.1 60													
410		2.1 62													
420		2.1 64													
430		2.1 66													
440		2.1 68													
450		2.1 69													
460		2.1 71													
470		2.1 73													
480	4.6 10	2.1 75													
490	4.6 12	2.1 77													
500	4.6 13	2.1 78													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20										0.7 10	0.5 13				
30								0.9 10	0.8 11	0.6 16	0.5 20				
40						1.1 10	0.9 12	0.9 14	0.8 16	0.6 22	0.5 27				
50					1.2 10	1 13	0.9 16	0.8 18	0.8 21	0.6 28	0.5 34				
60					1.2 13	1 17	0.9 20	0.8 23	0.8 25	0.6 34	0.5 41				
70				1.5 12	1.2 16	1 20	0.9 24	0.8 27	0.8 30	0.6 40	0.5 48				
80				1.4 14	1.2 19	1 24	0.9 28	0.8 31	0.8 34	0.6 46	0.5 55				
90				1.4 17	1.1 22	1 27	0.9 32	0.8 35	0.8 39	0.6 52	0.5 62				
100			1.9 11	1.4 19	1.1 25	1 31	0.9 35	0.8 40	0.7 44	0.6 58	0.5 70				
110			1.9 13	1.4 22	1.1 28	1 34	0.9 39	0.8 44	0.7 48	0.6 64	0.5 77				
120			1.8 15	1.4 24	1.1 31	1 37	0.9 43	0.8 48	0.7 53	0.6 70	0.5 84				
130			1.8 17	1.3 26	1.1 34	1 41	0.9 47	0.8 52	0.7 57	0.6 76	0.5 91				
140			1.8 19	1.3 29	1.1 37	1 44	0.9 50	0.8 56	0.7 62	0.6 81	0.5 98				
150			1.8 20	1.3 31	1.1 40	1 47	0.9 54	0.8 61	0.7 66	0.6 87					
160			1.8 22	1.3 33	1.1 43	1 51	0.9 58	0.8 65	0.7 71	0.6 93					
170			1.8 24	1.3 36	1.1 45	1 54	0.9 62	0.8 69	0.7 76	0.6 99					
180			1.8 26	1.3 38	1.1 48	1 57	0.9 65	0.8 73	0.7 80						
190			1.7 28	1.3 40	1.1 51	1 61	0.9 69	0.8 77	0.7 85						
200	3.1 10	1.7 29	1.3 43	1.1 54	1 64	0.9 73	0.8 81	0.7 89							
210	3.1 11	1.7 31	1.3 45	1.1 57	1 67	0.9 77	0.8 86	0.7 94							
220	3.1 12	1.7 33	1.3 47	1.1 60	1 71	0.9 81	0.8 90	0.7 98							
230	3 13	1.7 35	1.3 50	1.1 63	1 74	0.9 84	0.8 94								
240	3 14	1.7 36	1.3 52	1.1 65	1 77	0.9 88	0.8 98								
250	3 16	1.7 38	1.3 54	1.1 68	1 81	0.9 92									
260	3 17	1.7 40	1.3 57	1.1 71	1 84	0.9 96									
270	2.9 18	1.7 42	1.3 59	1.1 74	1 87	0.9 100									
280	2.9 19	1.7 43	1.3 61	1.1 77	1 91										
290	2.9 20	1.7 45	1.3 64	1.1 80	1 94										
300	2.9 21	1.7 47	1.3 66	1.1 82	1 97										
310	2.9 22	1.7 48	1.3 68	1.1 85											
320	2.9 23	1.7 50	1.3 71	1.1 88											
330	2.9 24	1.7 52	1.3 73	1.1 91											
340	2.8 25	1.7 54	1.3 75	1.1 94											
350	2.8 26	1.7 55	1.3 78	1.1 97											
360	2.8 27	1.7 57	1.3 80	1.1 100											
370	2.8 28	1.7 59	1.3 82												
380	2.8 29	1.7 60	1.3 85												
390	2.8 30	1.7 62	1.3 87												
400	2.8 31	1.7 64	1.3 89												
410	2.8 32	1.7 66	1.3 91												
420	2.8 34	1.7 67	1.3 94												
430	2.8 35	1.7 69	1.3 96												
440	2.8 35	1.7 71	1.3 98												
450	2.8 37	1.7 72													
460	2.8 38	1.7 74													
470	2.8 39	1.7 76													
480	2.8 40	1.7 78													
490	2.8 41	1.7 79													
500	2.7 42	1.7 81													

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10											0.6 12				
20											0.5 19				
30							1 11	0.9 13	0.8 15	0.6 15	0.5 21				
40							0.9 15	0.9 17	0.8 20	0.6 21	0.5 26				
50						1.1 12	0.9 19	0.8 22	0.8 24	0.6 33	0.5 41				
60					1.2 11	1 16	0.9 23	0.8 26	0.8 29	0.6 39	0.5 48				
70					1.2 15	1 19	0.9 27	0.8 30	0.8 34	0.6 45	0.5 55				
80				1.5 12	1.2 18	1 23	0.9 30	0.8 35	0.8 38	0.6 51	0.5 62				
90				1.4 14	1.2 21	1 26	0.9 34	0.8 39	0.8 43	0.6 57	0.5 69				
100				1.4 17	1.2 24	1 29	0.9 38	0.8 43	0.7 47	0.6 63	0.5 76				
110				1.4 20	1.1 27	1 33	0.9 42	0.8 47	0.7 52	0.6 69	0.5 83				
120			1.9 11	1.4 22	1.1 30	1 36	0.9 46	0.8 51	0.7 57	0.6 75	0.5 90				
130			1.9 14	1.4 25	1.1 33	1 40	0.9 50	0.8 56	0.7 61	0.6 81	0.5 97				
140			1.9 16	1.4 27	1.1 36	1 43	0.9 53	0.8 60	0.7 66	0.6 87					
150			1.8 18	1.4 29	1.1 39	1 46	0.9 57	0.8 64	0.7 70	0.6 93					
160			1.8 20	1.3 32	1.1 41	1 50	0.9 61	0.8 68	0.7 75	0.6 99					
170			1.8 22	1.3 34	1.1 44	1 53	0.9 65	0.8 72	0.7 80						
180			1.8 23	1.3 37	1.1 47	1 56	0.9 69	0.8 77	0.7 84						
190			1.8 25	1.3 39	1.1 50	1 60	0.9 72	0.8 81	0.7 89						
200			1.8 27	1.3 41	1.1 53	1 63	0.9 76	0.8 85	0.7 93						
210			1.8 29	1.3 44	1.1 56	1 66	0.9 80	0.8 89	0.7 98						
220			1.7 31	1.3 46	1.1 59	1 70	0.9 84	0.8 93							
230			1.7 33	1.3 48	1.1 61	1 73	0.9 87	0.8 98							
240			1.7 34	1.3 51	1.1 64	1 76	0.9 91								
250			1.7 36	1.3 53	1.1 67	1 80	0.9 95								
260		3.2 11	1.7 38	1.3 55	1.1 70	1 83	0.9 99								
270		3.1 12	1.7 40	1.3 58	1.1 73	1 86									
280		3.1 13	1.7 41	1.3 60	1.1 76	1 90									
290		3.1 15	1.7 43	1.3 62	1.1 79	1 93									
300		3 16	1.7 45	1.3 65	1.1 82	1 96									
310		3 17	1.7 47	1.3 67	1.1 84	1 100									
320		3 18	1.7 48	1.3 69	1.1 87										
330		3 19	1.7 50	1.3 72	1.1 90										
340		2.9 21	1.7 52	1.3 74	1.1 93										
350		2.9 22	1.7 54	1.3 76	1.1 96										
360		2.9 23	1.7 55	1.3 79	1.1 99										
370		2.9 24	1.7 57	1.3 81											
380		2.9 25	1.7 59	1.3 83											
390		2.9 26	1.7 61	1.3 86											
400		2.9 27	1.7 62	1.3 88											
410		2.8 29	1.7 64	1.3 90											
420		2.8 30	1.7 66	1.3 93											
430		2.8 31	1.7 67	1.3 95											
440		2.8 32	1.7 69	1.3 97											
450		2.8 33	1.7 71	1.3 100											
460		2.8 34	1.7 73												
470		2.8 35	1.7 74												
480		2.8 36	1.7 76												
490		2.8 37	1.7 78												
500		2.8 38	1.7 80												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20											0.6 11				
30										0.6 14	0.5 18				
40								0.9 11	0.8 14	0.6 20	0.5 26				
50						1.1 10	1 13	0.9 16	0.8 19	0.6 27	0.5 33				
60						1.1 14	0.9 17	0.9 21	0.8 23	0.6 33	0.5 40				
70					1.3 12	1.1 18	0.9 22	0.8 25	0.8 28	0.6 39	0.5 47				
80					1.2 16	1 21	0.9 26	0.8 29	0.8 33	0.6 45	0.5 54				
90				1.5 12	1.2 19	1 25	0.9 29	0.8 34	0.8 37	0.6 51	0.5 61				
100				1.5 14	1.2 22	1 28	0.9 33	0.8 38	0.8 42	0.6 56	0.5 69				
110				1.4 17	1.2 25	1 32	0.9 37	0.8 42	0.8 47	0.6 63	0.5 76				
120				1.4 20	1.1 28	1 35	0.9 41	0.8 46	0.8 51	0.6 68	0.5 83				
130				1.4 23	1.1 31	1 39	0.9 45	0.8 51	0.7 56	0.6 74	0.5 90				
140			2 12	1.4 25	1.1 34	1 42	0.9 49	0.8 55	0.7 60	0.6 80	0.5 97				
150			1.9 14	1.4 28	1.1 37	1 45	0.9 52	0.8 59	0.7 65	0.6 86					
160			1.9 16	1.4 30	1.1 40	1 49	0.9 56	0.8 63	0.7 70	0.6 92					
170			1.9 18	1.4 32	1.1 43	1 52	0.9 60	0.8 67	0.7 74	0.6 98					
180			1.8 20	1.3 35	1.1 46	1 55	0.9 64	0.8 72	0.7 79						
190			1.8 22	1.3 37	1.1 49	1 59	0.9 68	0.8 76	0.7 83						
200			1.8 24	1.3 40	1.1 52	1 62	0.9 71	0.8 80	0.7 88						
210			1.8 26	1.3 42	1.1 55	1 66	0.9 75	0.8 84	0.7 93						
220			1.8 28	1.3 45	1.1 57	1 69	0.9 79	0.8 88	0.7 97						
230			1.8 30	1.3 47	1.1 60	1 72	0.9 83	0.8 93							
240			1.8 32	1.3 49	1.1 63	1 76	0.9 87	0.8 97							
250			1.8 34	1.3 52	1.1 66	1 79	0.9 90								
260			1.7 36	1.3 54	1.1 69	1 82	0.9 94								
270			1.7 37	1.3 56	1.1 72	1 86	0.9 98								
280			1.7 39	1.3 59	1.1 75	1 89									
290			1.7 41	1.3 61	1.1 78	1 92									
300			1.7 43	1.3 63	1.1 81	1 96									
310		3.2 10	1.7 45	1.3 66	1.1 83	1 99									
320		3.2 11	1.7 46	1.3 68	1.1 86										
330		3.2 13	1.7 48	1.3 70	1.1 89										
340		3.1 14	1.7 50	1.3 73	1.1 92										
350		3.1 16	1.7 52	1.3 75	1.1 95										
360		3.1 17	1.7 53	1.3 77	1.1 98										
370		3 18	1.7 55	1.3 80											
380		3 20	1.7 57	1.3 82											
390		3 21	1.7 59	1.3 85											
400		3 22	1.7 61	1.3 87											
410		2.9 23	1.7 62	1.3 89											
420		2.9 25	1.7 64	1.3 92											
430		2.9 26	1.7 66	1.3 94											
440		2.9 27	1.7 67	1.3 96											
450		2.9 28	1.7 69	1.3 98											
460		2.9 29	1.7 71												
470		2.9 31	1.7 73												
480		2.9 32	1.7 74												
490		2.8 33	1.7 76												
500		2.8 34	1.7 78												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20												0.5	10		
30										0.7	11	0.6	14		
40									0.9	10	0.7	15	0.6	19	0.5
50							1.1	10	1	12	0.9	14	0.7	20	0.5
60							1.1	13	1	15	0.9	17	0.7	24	0.5
70						1.4	10	1.2	13	1.1	16	0.9	18	0.9	21
80						1.4	12	1.2	15	1	19	0.9	21	0.7	29
90						1.4	14	1.2	18	1	21	0.9	24	0.9	27
100				1.7	11	1.4	16	1.2	20	1	24	0.9	28	0.9	31
110				1.7	13	1.3	18	1.1	23	1	27	0.9	31	0.9	34
120				1.7	14	1.3	20	1.1	25	1	30	0.9	34	0.8	37
130				1.6	16	1.3	22	1.1	28	1	32	0.9	37	0.8	41
140				1.6	18	1.3	24	1.1	30	1	35	0.9	40	0.8	44
150			2.3	10	1.6	20	1.3	27	1.1	32	1	38	0.9	43	0.8
160			2.2	12	1.6	21	1.3	29	1.1	35	1	40	0.9	46	0.8
170			2.2	13	1.6	23	1.3	31	1.1	37	1	43	0.9	49	0.8
180			2.2	14	1.6	25	1.3	33	1.1	40	1	46	0.9	52	0.8
190			2.2	16	1.6	26	1.3	35	1.1	42	1	49	0.9	55	0.8
200			2.2	17	1.6	28	1.3	37	1.1	44	1	51	0.9	58	0.8
210			2.1	18	1.6	30	1.3	39	1.1	47	1	54	0.9	61	0.8
220			2.1	20	1.6	31	1.3	41	1.1	49	1	57	0.9	64	0.8
230			2.1	21	1.6	33	1.3	43	1.1	51	1	59	0.9	67	0.8
240			2.1	22	1.6	35	1.3	45	1.1	54	1	62	0.9	70	0.8
250			2.1	23	1.5	36	1.3	47	1.1	56	1	65	0.9	73	0.8
260			2.1	25	1.5	38	1.3	49	1.1	59	1	68	0.9	76	0.8
270			2.1	26	1.5	39	1.3	51	1.1	61	1	70	0.9	79	0.8
280			2.1	27	1.5	41	1.3	53	1.1	63	1	73	0.9	82	0.8
290			2.1	28	1.5	43	1.3	55	1.1	66	1	76	0.9	85	0.8
300			2.1	29	1.5	44	1.3	57	1.1	68	1	78	0.9	88	0.8
310			2.1	31	1.5	46	1.3	59	1.1	70	1	81	0.9	91	0.8
320			2.1	32	1.5	48	1.3	61	1.1	73	1	84	0.9	94	
330		3.8	10	2.1	33	1.5	49	1.3	63	1.1	75	1	87	0.9	97
340		3.8	10	2.1	34	1.5	51	1.3	65	1.1	78	1	89	0.9	100
350		3.8	11	2	35	1.5	52	1.3	67	1.1	80	1	92		
360		3.7	12	2	37	1.5	54	1.3	69	1.1	82	1	95		
370		3.7	13	2	38	1.5	56	1.3	71	1.1	85	1	97		
380		3.7	13	2	39	1.5	57	1.3	73	1.1	87	1	100		
390		3.7	14	2	40	1.5	59	1.3	75	1.1	89				
400		3.7	15	2	41	1.5	61	1.3	77	1.1	92				
410		3.7	16	2	43	1.5	62	1.3	79	1.1	94				
420		3.6	16	2	44	1.5	64	1.3	81	1.1	96				
430		3.6	17	2	45	1.5	65	1.3	83	1.1	99				
440		3.6	18	2	46	1.5	67	1.3	85						
450		3.6	19	2	47	1.5	69	1.3	87						
460		3.6	19	2	48	1.5	70	1.3	89						
470		3.6	20	2	49	1.5	72	1.3	91						
480		3.6	21	2	51	1.5	73	1.3	93						
490		3.6	21	2	52	1.5	75	1.3	95						
500		3.5	22	2	53	1.5	77	1.3	97						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 6

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																							0.6	10						
20																				0.7	10		0.5	16						
30																				0.7	14		0.6	19						
40																				0.7	19		0.6	24						
50																				0.7	23		0.6	29						
60																				0.7	28		0.6	35						
70																				0.7	32		0.6	40						
80																				0.7	37		0.6	45						
90																				0.7	41		0.6	50						
100																				0.7	45		0.6	56						
110																				0.7	50		0.6	61						
120																				0.7	54		0.6	66						
130																				0.7	58		0.6	71						
140																				0.7	63		0.6	77						
150																				0.7	67		0.6	82						
160																				0.7	72		0.6	87						
170																				0.7	76		0.6	92						
180																				0.7	80		0.6	98						
190																														
200																														
210																														
220																														
230																														
240																														
250																														
260																														
270																														
280																														
290																														
300																														
310																														
320																														
330																														
340																														
350																														
360																														
370																														
380																														
390																														

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20													0.5	11	
30															
40															
50															
60															
70															
80															
90															
100															
110															
120															
130															
140															
150															
160															
170															
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																														
20																				0.6	13	0.5	16							
30													0.9	11	0.8	13	0.7	15	0.6	20										
40									1.1	11	1	14	0.9	16	0.8	18	0.7	20	0.6	27										
50							1.3	10	1.1	15	0.9	18	0.8	21	0.8	24	0.7	26	0.6	35										
60							1.3	13	1.1	18	0.9	22	0.8	26	0.8	29	0.7	32	0.6	42										
70					1.8	10	1.3	17	1.1	22	0.9	26	0.8	30	0.8	34	0.7	37	0.6	49										
80					1.7	12	1.3	20	1	25	0.9	31	0.8	35	0.7	39	0.7	43	0.6	56										
90					1.7	15	1.2	23	1	29	0.9	35	0.8	40	0.7	44	0.7	49	0.6	64										
100					1.6	17	1.2	26	1	33	0.9	39	0.8	44	0.7	50	0.7	54	0.6	71										
110					1.6	19	1.2	29	1	36	0.9	43	0.8	49	0.7	55	0.7	60	0.6	78										
120					1.6	21	1.2	32	1	40	0.9	47	0.8	54	0.7	60	0.7	65	0.6	85										
130					1.6	24	1.2	34	1	43	0.9	51	0.8	58	0.7	65	0.7	71	0.6	93										
140					1.6	26	1.2	37	1	47	0.9	55	0.8	63	0.7	70	0.7	77	0.6	100										
150		2.8	10		1.6	28	1.2	40	1	51	0.9	60	0.8	68	0.7	75	0.7	82												
160		2.7	12		1.6	30	1.2	43	1	54	0.9	64	0.8	72	0.7	80	0.7	88												
170		2.7	13		1.6	33	1.2	46	1	58	0.9	68	0.8	77	0.7	86	0.7	94												
180		2.6	15		1.6	35	1.2	49	1	61	0.9	72	0.8	82	0.7	91	0.7	99												
190		2.6	16		1.5	37	1.2	52	1	65	0.9	76	0.8	86	0.7	96														
200		2.6	18		1.5	39	1.2	55	1	68	0.9	80	0.8	91																
210		2.6	19		1.5	41	1.2	58	1	72	0.9	84	0.8	96																
220		2.6	20		1.5	44	1.2	61	1	76	0.9	89	0.8	100																
230		2.5	22		1.5	46	1.2	64	1	79	0.9	93																		
240		2.5	23		1.5	48	1.2	67	1	83	0.9	97																		
250		2.5	25		1.5	50	1.2	70	1	86																				
260		2.5	26		1.5	52	1.2	72	1	90																				
270		2.5	27		1.5	55	1.2	75	1	93																				
280		2.5	29		1.5	57	1.2	78	1	97																				
290		2.5	30		1.5	59	1.2	81																						
300		2.5	31		1.5	61	1.2	84																						
310		2.5	33		1.5	63	1.2	87																						
320		2.5	34		1.5	65	1.2	90																						
330		2.4	35		1.5	68	1.2	93																						
340		2.4	37		1.5	70	1.2	96																						
350		2.4	38		1.5	72	1.2	99																						
360		2.4	39		1.5	74																								
370		2.4	40		1.5	76																								
380		2.4	42		1.5	79																								
390		2.4	43		1.5	81																								
400		2.4	44		1.5	83																								
410		2.4	46		1.5	85																								
420		2.4	47		1.5	87																								
430		2.4	48		1.5	89																								
440		2.4	50		1.5	92																								
450	5.4	10	2.4	51	1.5	94																								
460	5.3	10	2.4	52	1.5	96																								
470	5.3	11	2.4	53	1.5	98																								
480	5.3	12	2.4	55	1.5	100																								
490	5.3	12	2.4	56																										
500	5.3	13	2.4	57																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50						1 12	0.9 10	0.8 12	0.7 14	0.6 12	0.5 15				
60						1 17	0.9 15	0.8 17	0.7 19	0.6 19	0.5 24				
70						1.1 13	0.9 20	0.8 23	0.7 25	0.6 27					
80						1.1 17	0.9 21	0.8 25	0.7 31	0.6 41					
90						1.1 20	0.9 25	0.8 29	0.7 37	0.6 48					
100						1.1 24	0.9 29	0.8 34	0.7 42	0.6 56					
110						1.3 18	0.9 34	0.8 39	0.7 48	0.6 63					
120			1.8 11	1.3 21	1 28	0.9 38	0.8 44	0.7 49	0.7 54	0.6 70					
130			1.7 14	1.3 24	1 32	0.9 42	0.8 48	0.7 54	0.7 59	0.6 77					
140			1.7 17	1.2 27	1 35	0.9 46	0.8 53	0.7 59	0.7 65	0.6 85					
150			1.6 19	1.2 30	1 39	0.9 50	0.8 58	0.7 64	0.7 70	0.6 92					
160			1.6 21	1.2 33	1 42	0.9 55	0.8 62	0.7 69	0.7 76	0.6 99					
170			1.6 24	1.2 36	1 46	0.9 59	0.8 67	0.7 75	0.7 82						
180			1.6 26	1.2 39	1 50	0.9 63	0.8 72	0.7 80	0.7 87						
190			1.6 28	1.2 42	1 53	0.9 67	0.8 76	0.7 85	0.7 93						
200			1.6 31	1.2 45	1 57	0.9 71	0.8 81	0.7 90	0.7 98						
210			1.6 33	1.2 48	1 60	0.9 75	0.8 86	0.7 95							
220			1.6 35	1.2 51	1 64	0.9 79	0.8 90	0.7 100							
230			2.8 11	1.6 37	1 67	0.9 84	0.8 95								
240			2.8 13	1.6 40	1 71	0.9 88	0.8 100								
250			2.7 14	1.6 42	1 75	0.9 92									
260			2.7 16	1.5 44	1 78	0.9 96									
270			2.7 17	1.5 46	1 82	0.9 100									
280			2.6 19	1.5 49	1 85										
290			2.6 20	1.5 51	1 89										
300			2.6 22	1.5 53	1 92										
310			2.6 23	1.5 55	1 96										
320			2.6 25	1.5 57	1 100										
330			2.5 26	1.5 60											
340			2.5 28	1.5 62											
350			2.5 29	1.5 64											
360			2.5 31	1.5 66											
370			2.5 32	1.5 68											
380			2.5 33	1.5 71											
390			2.5 35	1.5 73											
400			2.5 36	1.5 75											
410			2.5 37	1.5 77											
420			2.5 39	1.5 79											
430			2.4 40	1.5 82											
440			2.4 41	1.5 84											
450			2.4 43	1.5 86											
460			2.4 44	1.5 88											
470			2.4 46	1.5 90											
480			2.4 47	1.5 92											
490			2.4 48	1.5 95											
500			2.4 49	1.5 97											
			2.4 51	1.5 99											
			2.4 52												
			2.4 53												
			2.4 55												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)	D(ft)	B(ft)
10																				0.6	11	0.5	14							
20															0.9	10	0.8	13	0.6	19	0.5	23								
30											1	10	0.9	14	0.8	16	0.7	19	0.6	26										
40											1	15	0.9	19	0.8	22	0.7	24	0.6	33										
50									1.2	11	1	20	0.8	24	0.8	27	0.7	30	0.6	41										
60									1.1	15	1	20	0.8	24	0.8	27	0.7	30	0.6	41										
70							1.4	12	1.1	19	0.9	24	0.8	28	0.8	32	0.7	36	0.6	48										
80							1.3	16	1.1	23	0.9	28	0.8	33	0.8	38	0.7	42	0.6	55										
90							1.3	19	1.1	26	0.9	33	0.8	38	0.8	43	0.7	47	0.6	62										
100					1.8	10	1.3	22	1.1	30	0.9	37	0.8	43	0.8	48	0.7	53	0.6	70										
110					1.8	13	1.3	25	1	34	0.9	41	0.8	47	0.7	53	0.7	59	0.6	77										
120					1.7	16	1.3	28	1	38	0.9	45	0.8	52	0.7	58	0.7	64	0.6	84										
130					1.7	19	1.2	32	1	41	0.9	49	0.8	57	0.7	64	0.7	70	0.6	92										
140					1.7	21	1.2	35	1	45	0.9	54	0.8	62	0.7	69	0.7	75	0.6	99										
150					1.6	24	1.2	38	1	48	0.9	58	0.8	66	0.7	74	0.7	81												
160					1.6	26	1.2	41	1	52	0.9	62	0.8	71	0.7	79	0.7	87												
170					1.6	28	1.2	44	1	56	0.9	66	0.8	76	0.7	84	0.7	92												
180					1.6	31	1.2	47	1	59	0.9	70	0.8	80	0.7	89	0.7	98												
190					1.6	33	1.2	50	1	63	0.9	75	0.8	85	0.7	95														
200					1.6	35	1.2	53	1	66	0.9	79	0.8	90	0.7	100														
210					1.6	38	1.2	55	1	70	0.9	83	0.8	94																
220					1.6	40	1.2	59	1	74	0.9	87	0.8	99																
230			2.8	11	1.6	42	1.2	61	1	77	0.9	91																		
240			2.8	13	1.6	45	1.2	64	1	81	0.9	95																		
250			2.8	15	1.5	47	1.2	67	1	84	0.9	99																		
260			2.7	17	1.5	49	1.2	70	1	88																				
270			2.7	18	1.5	51	1.2	73	1	91																				
280			2.7	20	1.5	54	1.2	76	1	95																				
290			2.6	22	1.5	56	1.2	79	1	99																				
300			2.6	23	1.5	58	1.2	82																						
310			2.6	25	1.5	60	1.2	85																						
320			2.6	26	1.5	62	1.2	88																						
330			2.6	28	1.5	65	1.2	91																						
340			2.5	29	1.5	67	1.2	94																						
350			2.5	31	1.5	69	1.2	97																						
360			2.5	32	1.5	71	1.2	100																						
370			2.5	34	1.5	73																								
380			2.5	35	1.5	76																								
390			2.5	37	1.5	78																								
400			2.5	38	1.5	80																								
410			2.5	39	1.5	82																								
420			2.5	41	1.5	84																								
430			2.5	42	1.5	87																								
440			2.5	44	1.5	89																								
450			2.4	45	1.5	91																								
460			2.4	46	1.5	93																								
470			2.4	48	1.5	95																								
480			2.4	49	1.5	98																								
490			2.4	50	1.5	100																								
500			2.4	52																										

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20											0.6 10	0.5 12			
30											0.6 16	0.5 19			
40											0.6 23				
50						1.2 10	1 13	0.9 15	0.8 17	0.7 18	0.6 29				
60					1.3 10	1.1 13	1 16	0.9 18	0.8 21	0.6 28	0.6 35				
70					1.3 13	1.1 16	1 19	0.9 22	0.8 25	0.6 33	0.6 41				
80				1.6 10	1.3 15	1.1 19	1 22	0.9 26	0.8 29	0.6 38	0.5 47				
90				1.6 12	1.3 18	1.1 22	1 26	0.9 29	0.8 32	0.6 43	0.5 53				
100				1.5 14	1.2 20	1.1 25	1 29	0.9 33	0.8 36	0.6 48	0.5 59				
110				1.5 17	1.2 22	1.1 28	0.9 32	0.9 36	0.8 40	0.6 53	0.5 65				
120		2.1 10	1.5 19	1.2 25	1.1 30	0.9 35	0.9 40	0.8 44	0.6 59	0.5 71					
130		2.1 12	1.5 21	1.2 27	1.1 33	0.9 38	0.9 43	0.8 48	0.6 64	0.5 77					
140		2 13	1.5 23	1.2 30	1.1 36	0.9 42	0.9 47	0.8 52	0.6 69	0.5 83					
150		2 15	1.5 24	1.2 32	1 39	0.9 45	0.9 50	0.8 56	0.6 74	0.5 89					
160		2 16	1.5 26	1.2 35	1 42	0.9 48	0.9 54	0.8 59	0.6 79	0.5 95					
170		2 18	1.5 28	1.2 37	1 44	0.9 51	0.9 57	0.8 63	0.6 84						
180		2 19	1.5 30	1.2 39	1 47	0.9 54	0.9 61	0.8 67	0.6 89						
190		2 21	1.4 32	1.2 42	1 50	0.9 57	0.9 64	0.8 71	0.6 94						
200		1.9 22	1.4 34	1.2 44	1 53	0.9 61	0.9 68	0.8 75	0.6 99						
210		1.9 24	1.4 36	1.2 46	1 55	0.9 64	0.8 71	0.8 79							
220		1.9 25	1.4 38	1.2 49	1 58	0.9 67	0.8 75	0.8 82							
230		1.9 27	1.4 40	1.2 51	1 61	0.9 70	0.8 78	0.8 86							
240		1.9 28	1.4 42	1.2 54	1 64	0.9 73	0.8 82	0.8 90							
250		1.9 30	1.4 44	1.2 56	1 67	0.9 76	0.8 85	0.8 94							
260	3.5 10	1.9 31	1.4 46	1.2 58	1 69	0.9 79	0.8 89	0.8 98							
270	3.4 11	1.9 33	1.4 48	1.2 61	1 72	0.9 83	0.8 92								
280	3.4 11	1.9 34	1.4 50	1.2 63	1 75	0.9 86	0.8 96								
290	3.4 12	1.9 35	1.4 52	1.2 65	1 78	0.9 89	0.8 99								
300	3.4 13	1.9 37	1.4 54	1.2 68	1 80	0.9 92									
310	3.3 14	1.9 38	1.4 55	1.2 70	1 83	0.9 95									
320	3.3 15	1.9 40	1.4 57	1.2 72	1 86	0.9 99									
330	3.3 16	1.9 41	1.4 59	1.2 75	1 89										
340	3.3 17	1.9 42	1.4 61	1.2 77	1 91										
350	3.3 18	1.9 44	1.4 63	1.2 80	1 94										
360	3.3 19	1.9 45	1.4 65	1.2 82	1 97										
370	3.2 20	1.9 47	1.4 67	1.2 84	1 100										
380	3.2 20	1.9 48	1.4 69	1.2 87											
390	3.2 21	1.9 49	1.4 71	1.2 89											
400	3.2 22	1.9 51	1.4 73	1.2 91											
410	3.2 23	1.9 52	1.4 75	1.2 94											
420	3.2 24	1.8 54	1.4 77	1.2 96											
430	3.2 25	1.8 55	1.4 78	1.2 98											
440	3.2 26	1.8 56	1.4 80												
450	3.2 26	1.8 58	1.4 82												
460	3.2 27	1.8 59	1.4 84												
470	3.2 28	1.8 61	1.4 86												
480	3.1 29	1.8 62	1.4 88												
490	3.1 30	1.8 63	1.4 90												
500	3.1 31	1.8 65	1.4 92												

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															
70															
80															
90															
100															
110															
120															
130															
140															
150															
160															
170															
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20												0.5 11			
30												0.5 18			
40												0.5 25			
50								1 12	0.9 10	0.7 11	0.6 15				
60								0.9 14	0.8 19	0.7 16	0.6 21				
70								0.9 20	0.8 23	0.7 22	0.6 27				
80					1.4 10	1.1 16	1 20	0.9 23	0.8 27	0.6 37	0.6 46				
90					1.3 13	1.1 19	1 23	0.9 27	0.8 31	0.6 42	0.6 52				
100					1.3 16	1.1 22	1 27	0.9 31	0.8 34	0.6 47	0.5 58				
110				1.7 11	1.3 19	1.1 25	1 30	0.9 34	0.8 38	0.6 52	0.5 64				
120				1.6 13	1.3 22	1.1 28	1 33	0.9 38	0.8 42	0.6 57	0.5 70				
130				1.6 16	1.3 24	1.1 31	1 36	0.9 42	0.8 46	0.6 62	0.5 76				
140				1.6 18	1.2 27	1.1 34	1 40	0.9 45	0.8 50	0.6 67	0.5 82				
150				1.5 20	1.2 29	1.1 36	0.9 43	0.9 49	0.8 54	0.6 72	0.5 88				
160				1.5 22	1.2 32	1.1 39	0.9 46	0.9 52	0.8 58	0.6 77	0.5 94				
170			2.2 10	1.5 24	1.2 34	1.1 42	0.9 49	0.9 56	0.8 62	0.6 82	0.5 100				
180			2.2 12	1.5 27	1.2 37	1.1 45	0.9 52	0.9 59	0.8 66	0.6 88					
190			2.1 14	1.5 29	1.2 39	1.1 48	0.9 56	0.9 63	0.8 69	0.6 93					
200			2.1 16	1.5 31	1.2 41	1 51	0.9 59	0.9 66	0.8 73	0.6 98					
210			2.1 17	1.5 33	1.2 44	1 53	0.9 62	0.9 70	0.8 77						
220			2 19	1.5 35	1.2 46	1 56	0.9 65	0.9 73	0.8 81						
230			2 21	1.5 37	1.2 49	1 59	0.9 68	0.9 77	0.8 85						
240			2 22	1.5 39	1.2 51	1 62	0.9 71	0.9 80	0.8 89						
250			2 24	1.4 41	1.2 53	1 65	0.9 75	0.9 84	0.8 92						
260			2 26	1.4 43	1.2 56	1 68	0.9 78	0.9 87	0.8 96						
270			2 27	1.4 45	1.2 58	1 70	0.9 81	0.9 91	0.8 100						
280			1.9 29	1.4 47	1.2 61	1 73	0.9 84	0.8 94							
290			1.9 30	1.4 49	1.2 63	1 76	0.9 87	0.8 98							
300			1.9 32	1.4 51	1.2 66	1 79	0.9 90								
310			1.9 33	1.4 52	1.2 68	1 81	0.9 94								
320			1.9 35	1.4 54	1.2 70	1 84	0.9 97								
330			1.9 36	1.4 56	1.2 73	1 87	0.9 100								
340			1.9 38	1.4 58	1.2 75	1 90									
350			1.9 39	1.4 60	1.2 77	1 93									
360			1.9 41	1.4 62	1.2 80	1 95									
370			1.9 42	1.4 64	1.2 82	1 98									
380			1.9 44	1.4 66	1.2 85										
390			1.9 45	1.4 68	1.2 87										
400			1.9 47	1.4 70	1.2 89										
410		3.6 10	1.9 48	1.4 72	1.2 92										
420		3.5 11	1.9 50	1.4 74	1.2 94										
430		3.5 12	1.9 51	1.4 76	1.2 96										
440		3.5 13	1.9 53	1.4 78	1.2 99										
450		3.4 14	1.9 54	1.4 80											
460		3.4 15	1.9 55	1.4 81											
470		3.4 17	1.9 57	1.4 83											
480		3.4 18	1.9 58	1.4 85											
490		3.4 19	1.9 60	1.4 87											
500		3.3 20	1.9 61	1.4 89											

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40												0.8 10	0.7 13	0.6 11	0.5 13
50												0.8 13	0.7 17	0.6 16	0.5 18
60												0.8 16	0.7 21	0.6 20	0.5 23
70								1.2 11	1 13	0.8 19	0.7 24	0.6 24	0.5 28		
80								1.3 11	1 15	0.8 22	0.7 28	0.6 29	0.5 33		
90						1.5 10	1.3 13	1.1 16	1 18	0.8 26	0.7 32	0.6 33	0.5 38		
100						1.4 12	1.2 15	1.1 18	1 20	0.8 29	0.7 36	0.6 38	0.5 43		
110					1.7 10	1.4 14	1.2 17	1.1 20	1 23	0.8 32	0.7 39	0.6 42	0.5 48		
120					1.7 11	1.4 15	1.2 19	1.1 22	1 25	0.8 35	0.7 43	0.6 46	0.5 53		
130					1.7 13	1.4 17	1.2 21	1.1 24	1 27	0.8 38	0.6 47	0.6 51	0.5 57		
140					1.6 14	1.4 19	1.2 23	1.1 26	1 29	0.8 41	0.6 51	0.6 55	0.5 62		
150				2.1 10	1.6 16	1.4 20	1.2 25	1.1 28	1 32	0.8 44	0.6 54	0.6 59	0.5 67		
160				2.1 11	1.6 17	1.4 22	1.2 26	1.1 30	1 34	0.8 47	0.6 58	0.6 62	0.5 72		
170				2 12	1.6 19	1.3 24	1.2 28	1.1 33	1 36	0.8 50	0.6 62	0.6 68	0.5 77		
180				2 13	1.6 20	1.3 25	1.2 30	1.1 35	1 39	0.8 53	0.6 66	0.6 72	0.5 82		
190				2 15	1.6 21	1.3 27	1.2 32	1.1 37	1 41	0.8 56	0.6 69	0.6 77	0.5 87		
200				2 16	1.6 23	1.3 29	1.2 34	1.1 39	1 43	0.8 59	0.6 73	0.6 81	0.5 92		
210				2 17	1.6 24	1.3 30	1.2 36	1.1 41	1 46	0.8 62	0.6 77	0.6 86	0.5 97		
220				2 18	1.6 26	1.3 32	1.2 38	1.1 43	1 48	0.8 66	0.6 81	0.6 90			
230				2 19	1.6 27	1.3 34	1.2 40	1.1 45	1 50	0.8 69	0.6 84	0.6 94			
240			2.8 10	1.9 20	1.6 28	1.3 35	1.2 42	1.1 47	1 53	0.8 72	0.6 88	0.6 98			
250			2.8 11	1.9 21	1.5 30	1.3 37	1.2 43	1.1 49	1 55	0.8 75	0.6 92				
260			2.8 11	1.9 23	1.5 31	1.3 38	1.2 45	1.1 51	1 57	0.8 78	0.6 96				
270			2.7 12	1.9 24	1.5 32	1.3 40	1.2 47	1.1 53	1 60	0.8 81	0.6 99				
280			2.7 13	1.9 25	1.5 34	1.3 42	1.2 49	1.1 56	1 62	0.8 84					
290			2.7 14	1.9 26	1.5 35	1.3 43	1.2 51	1 58	1 64	0.8 87					
300			2.7 15	1.9 27	1.5 37	1.3 45	1.2 53	1 60	1 66	0.8 90					
310			2.7 16	1.9 28	1.5 38	1.3 47	1.2 55	1 62	1 69	0.8 93					
320			2.7 17	1.9 29	1.5 39	1.3 48	1.2 56	1 64	1 71	0.8 96					
330			2.7 17	1.9 30	1.5 41	1.3 50	1.2 58	1 66	1 73	0.8 99					
340			2.6 18	1.9 31	1.5 42	1.3 51	1.2 60	1 68	1 76						
350			2.6 19	1.9 32	1.5 43	1.3 53	1.2 62	1 70	1 78						
360			2.6 20	1.9 34	1.5 45	1.3 55	1.2 64	1 72	1 80						
370			2.6 21	1.9 35	1.5 46	1.3 56	1.2 66	1 74	1 82						
380			2.6 22	1.9 36	1.5 47	1.3 58	1.2 67	1 76	1 85						
390			2.6 22	1.9 37	1.5 49	1.3 59	1.2 69	1 78	1 87						
400			2.6 23	1.9 38	1.5 50	1.3 61	1.2 71	1 81	1 89						
410			2.6 24	1.9 39	1.5 52	1.3 63	1.2 73	1 83	1 92						
420			2.6 25	1.9 40	1.5 53	1.3 64	1.2 75	1 85	1 94						
430			2.6 26	1.9 41	1.5 54	1.3 66	1.1 77	1 87	1 96						
440			2.6 26	1.9 42	1.5 56	1.3 68	1.1 79	1 89	1 99						
450			2.6 27	1.9 43	1.5 57	1.3 69	1.1 81	1 91							
460			2.6 28	1.9 44	1.5 58	1.3 71	1.1 82	1 93							
470			2.6 29	1.9 45	1.5 60	1.3 72	1.1 84	1 95							
480			2.6 29	1.9 47	1.5 61	1.3 74	1.1 86	1 97							
490			2.6 30	1.9 48	1.5 62	1.3 76	1.1 88	1 99							
500			2.5 31	1.9 49	1.5 64	1.3 77	1.1 90								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50													0.6 10	0.6 12	
60													0.6 15	0.5 17	
70													0.6 19	0.5 22	
80													0.6 24	0.5 27	
90													0.6 28	0.5 32	
100													0.6 33	0.5 37	
110													0.6 37	0.5 42	
120													0.6 41	0.5 47	
130													0.6 46	0.5 52	
140													0.6 50	0.5 57	
150													0.6 54	0.5 62	
160													0.6 58	0.5 67	
170													0.6 61	0.5 72	
180													0.6 65	0.5 77	
190													0.6 69	0.5 81	
200													0.6 73	0.5 86	
210													0.6 76	0.5 91	
220													0.6 79	0.5 96	
230													0.6 81		
240													0.6 84		
250													0.6 88		
260													0.6 91		
270													0.6 95		
280													0.6 99		
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40													0.6	12	
50													0.5	17	
60											0.9	10	0.6	19	0.5
70											0.8	14	0.6	23	0.5
80											0.8	17	0.6	28	0.5
90									1.1	12	0.8	21	0.6	32	0.5
100								1.2	12	1.1	15	0.8	24	0.6	36
110								1.2	14	1	17	0.8	27	0.6	41
120								1.3	13	1	20	0.8	30	0.6	45
130						1.5	10	1.3	15	1	22	0.8	33	0.6	50
140						1.5	12	1.3	17	1	25	0.8	36	0.6	54
150						1.4	14	1.2	19	1	27	0.8	39	0.6	58
160						1.4	16	1.2	21	1	30	0.8	43	0.6	63
170					1.7	11	1.4	1.2	23	1	32	0.8	46	0.6	67
180					1.7	13	1.4	1.2	25	1	34	0.8	49	0.6	71
190					1.7	15	1.4	1.2	27	1	37	0.8	52	0.6	76
200					1.7	16	1.4	1.2	29	1	39	0.8	55	0.6	80
210					1.6	18	1.4	1.2	31	1	41	0.8	58	0.6	85
220					1.6	20	1.4	1.2	33	1	44	0.8	61	0.6	89
230				2.1	10	1.6	21	1.2	35	1	46	0.8	64	0.6	93
240				2.1	12	1.6	23	1.2	37	1	48	0.8	67	0.6	98
250				2.1	13	1.6	24	1.2	39	1	51	0.8	70	0.6	87
260				2.1	15	1.6	26	1.2	41	1	53	0.8	73	0.6	91
270				2	16	1.6	27	1.2	43	1	55	0.8	77	0.6	95
280				2	18	1.6	29	1.2	45	1	58	0.8	80	0.6	98
290				2	19	1.6	30	1.2	47	1	60	0.8	83		
300				2	20	1.6	31	1.2	48	1	62	0.8	86		
310				2	21	1.6	33	1.2	50	1	65	0.8	89		
320				2	23	1.6	34	1.2	52	1	67	0.8	92		
330				2	24	1.6	36	1.2	54	1	69	0.8	95		
340				2	25	1.5	37	1.2	56	1	72	0.8	98		
350				1.9	26	1.5	39	1.2	58	1	74				
360				1.9	27	1.5	40	1.2	60	1	76				
370				1.9	29	1.5	41	1.2	62	1	70				
380			2.9	11	1.9	30	1.5	1.2	63	1	73	1	81		
390			2.8	12	1.9	31	1.5	1.2	65	1	75	1	83		
400			2.8	13	1.9	32	1.5	1.2	67	1	77	1	85		
410			2.8	14	1.9	33	1.5	1.2	69	1	79	1	88		
420			2.8	15	1.9	34	1.5	1.2	71	1	81	1	90		
430			2.8	16	1.9	36	1.5	1.2	73	1	83	1	92		
440			2.7	17	1.9	37	1.5	1.2	75	1	85	1	95		
450			2.7	18	1.9	38	1.5	1.2	77	1	87	1	97		
460			2.7	19	1.9	39	1.5	1.2	78	1	89	1	99		
470			2.7	20	1.9	40	1.5	1.2	80	1	91				
480			2.7	21	1.9	41	1.5	1.2	82	1	93				
490			2.7	22	1.9	42	1.5	1.2	84	1	95				
500			2.7	23	1.9	44	1.5	1.2	86	1	98				
			2.6	23	1.9	45	1.5	1.2	88	1	100				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30														0.5	11
40														0.5	16
50														0.5	20
60										1	10	0.8	14	0.7	17
70										0.9	13	0.8	17	0.7	20
80										0.9	15	0.8	19	0.7	23
90										0.9	17	0.8	22	0.7	26
100									1.2	11	0.9	19	0.8	25	0.7
110								1.4	10	1.2	12	0.9	21	0.7	27
120							1.5	11	1.3	12	1.2	14	0.9	21	0.7
130							1.5	12	1.3	13	1.2	16	0.9	24	0.7
140							1.5	14	1.3	17	1.2	19	0.9	28	0.7
150						1.7	10	1.5	15	1.3	18	1.2	21	0.9	30
160						1.7	11	1.5	16	1.3	20	1.2	22	0.9	32
170						1.7	13	1.5	18	1.3	21	1.2	24	0.9	35
180					2	10	1.7	15	1.4	19	1.3	22	1.2	26	0.9
190					2	11	1.7	16	1.4	20	1.3	24	1.2	27	0.9
200					2	12	1.6	17	1.4	22	1.3	25	1.2	29	0.9
210					2	13	1.6	19	1.4	23	1.3	27	1.2	31	0.9
220					2	14	1.6	20	1.4	24	1.3	28	1.1	32	0.9
230					2	15	1.6	21	1.4	26	1.3	30	1.1	34	0.9
240					1.9	16	1.6	22	1.4	27	1.3	31	1.1	35	0.9
250				2.5	10	1.9	17	1.6	23	1.4	28	1.3	33	1.1	37
260				2.5	11	1.9	18	1.6	24	1.4	29	1.3	34	1.1	39
270				2.5	12	1.9	19	1.6	25	1.4	31	1.3	36	1.1	40
280				2.5	13	1.9	20	1.6	26	1.4	32	1.3	37	1.1	42
290				2.5	13	1.9	21	1.6	28	1.4	33	1.2	39	1.1	43
300				2.5	14	1.9	22	1.6	29	1.4	35	1.2	40	1.1	45
310				2.4	15	1.9	23	1.6	30	1.4	36	1.2	41	1.1	47
320				2.4	16	1.9	24	1.6	31	1.4	37	1.2	43	1.1	48
330				2.4	17	1.9	25	1.6	32	1.4	38	1.2	44	1.1	50
340				2.4	17	1.9	26	1.6	33	1.4	40	1.2	46	1.1	51
350				2.4	18	1.9	27	1.6	34	1.4	41	1.2	47	1.1	53
360				2.4	19	1.9	28	1.6	35	1.4	42	1.2	49	1.1	55
370				2.4	20	1.9	29	1.6	36	1.4	44	1.2	50	1.1	56
380				2.4	20	1.9	30	1.6	38	1.4	45	1.2	51	1.1	58
390				2.4	21	1.9	31	1.6	39	1.4	46	1.2	53	1.1	59
400				2.4	22	1.9	31	1.6	40	1.4	47	1.2	54	1.1	61
410			3.5	10	2.4	23	1.9	32	1.6	41	1.4	49	1.2	56	1.1
420			3.5	10	2.4	23	1.9	33	1.6	42	1.4	50	1.2	57	1.1
430			3.4	11	2.4	24	1.9	34	1.6	43	1.4	51	1.2	59	1.1
440			3.4	12	2.4	25	1.9	35	1.6	44	1.4	52	1.2	60	1.1
450			3.4	12	2.3	26	1.9	36	1.6	45	1.4	54	1.2	62	1.1
460			3.4	13	2.3	26	1.9	37	1.6	46	1.4	55	1.2	63	1.1
470			3.4	13	2.3	27	1.9	38	1.6	47	1.4	56	1.2	65	1.1
480			3.4	14	2.3	28	1.8	39	1.6	49	1.4	58	1.2	66	1.1
490			3.4	14	2.3	28	1.8	40	1.6	50	1.4	59	1.2	67	1.1
500			3.4	15	2.3	29	1.8	41	1.6	51	1.4	60	1.2	69	1.1

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40														0.5 11	
50												0.7 10	0.6 12	0.5 15	
60											0.8 10	0.7 13	0.6 15	0.5 20	
70										1 11	0.8 13	0.7 16	0.6 19	0.5 24	
80										0.9 13	0.8 16	0.7 19	0.6 23	0.5 28	
90										0.9 16	0.8 18	0.7 23	0.6 26	0.5 33	
100									1.3 10	0.9 18	0.8 21	0.7 26	0.6 30	0.5 37	
110								1.4 10	1.2 12	0.9 20	0.8 24	0.7 29	0.6 33	0.5 41	
120								1.4 11	1.2 14	0.9 23	0.8 27	0.7 32	0.6 37		
130							1.6 10	1.4 13	1.2 16	0.9 25	0.8 29	0.7 35	0.6 41		
140							1.5 11	1.3 15	1.2 18	0.9 27	0.7 35	0.6 42	0.5 48		
150							1.5 13	1.3 16	1.2 19	0.9 29	0.7 38	0.6 45	0.5 51		
160						1.8 10	1.5 14	1.3 18	1.2 21	0.9 32	0.7 40	0.6 48	0.5 55		
170							1.5 16	1.3 19	1.2 23	0.9 34	0.7 43	0.6 51	0.5 58		
180							1.5 17	1.3 21	1.2 24	0.9 36	0.7 46	0.6 54	0.5 62		
190							1.7 14	1.5 18	1.3 22	1.2 26	0.9 38	0.7 48	0.6 66		
200							1.7 15	1.4 20	1.3 24	1.2 28	0.9 40	0.7 51	0.6 69		
210					2.1 10	1.7 16	1.4 21	1.3 25	1.2 29	0.9 43	0.7 54	0.6 64	0.5 73		
220					2.1 11	1.7 17	1.4 22	1.3 27	1.2 31	0.9 45	0.7 56	0.6 67	0.5 76		
230					2 12	1.7 19	1.4 24	1.3 28	1.2 33	0.9 47	0.7 59	0.6 70	0.5 80		
240					2 13	1.6 20	1.4 25	1.3 30	1.2 34	0.9 49	0.7 62	0.6 73	0.5 83		
250					2 14	1.6 21	1.4 26	1.3 31	1.1 36	0.9 51	0.7 64	0.6 76	0.5 87		
260					2 15	1.6 22	1.4 28	1.3 33	1.1 37	0.9 53	0.7 67	0.6 79	0.5 91		
270					2 16	1.6 23	1.4 29	1.3 34	1.1 39	0.9 56	0.7 70	0.6 82	0.5 94		
280					2 17	1.6 24	1.4 30	1.3 36	1.1 41	0.9 58	0.7 73	0.6 86	0.5 98		
290					2 18	1.6 26	1.4 32	1.3 37	1.1 42	0.9 60	0.7 75	0.6 89			
300				2.6 10	1.9 19	1.6 27	1.4 33	1.3 39	1.1 44	0.9 62	0.7 78	0.6 92			
310				2.6 11	1.9 20	1.6 28	1.4 34	1.3 40	1.1 46	0.9 64	0.7 81	0.6 95			
320				2.5 12	1.9 21	1.6 29	1.4 36	1.2 42	1.1 47	0.9 67	0.7 83	0.6 98			
330				2.5 12	1.9 22	1.6 30	1.4 37	1.2 43	1.1 49	0.9 69	0.7 86				
340				2.5 13	1.9 24	1.6 31	1.4 38	1.2 45	1.1 50	0.9 71	0.7 89				
350				2.5 14	1.9 24	1.6 33	1.4 40	1.2 46	1.1 52	0.9 73	0.7 91				
360				2.5 15	1.9 25	1.6 34	1.4 41	1.2 48	1.1 54	0.9 75	0.7 94				
370				2.5 16	1.9 26	1.6 35	1.4 42	1.2 49	1.1 55	0.9 77	0.7 97				
380				2.4 17	1.9 27	1.6 36	1.4 43	1.2 50	1.1 57	0.9 80	0.7 99				
390				2.4 18	1.9 28	1.6 37	1.4 45	1.2 52	1.1 58	0.9 82					
400				2.4 18	1.9 29	1.6 38	1.4 46	1.2 53	1.1 60	0.9 84					
410				2.4 19	1.9 30	1.6 39	1.4 47	1.2 55	1.1 62	0.9 86					
420				2.4 20	1.9 31	1.6 40	1.4 49	1.2 56	1.1 63	0.9 88					
430				2.4 21	1.9 32	1.6 42	1.4 50	1.2 58	1.1 65	0.9 90					
440				2.4 22	1.9 33	1.6 43	1.4 51	1.2 59	1.1 66	0.9 93					
450				2.4 22	1.9 34	1.6 44	1.4 53	1.2 60	1.1 68	0.9 95					
460				2.4 23	1.9 35	1.6 45	1.4 54	1.2 62	1.1 70	0.9 97					
470				2.4 24	1.9 36	1.6 46	1.4 55	1.2 63	1.1 71	0.9 99					
480				2.4 25	1.9 37	1.6 47	1.4 56	1.2 65	1.1 73						
490				2.4 25	1.9 38	1.6 48	1.4 58	1.2 66	1.1 74						
500				2.4 26	1.9 39	1.6 49	1.4 59	1.2 68	1.1 76						

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.75

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)							
10																						
20																						
30														0.5	10							
40														0.5	15							
50														0.5	19							
60											0.8	12	0.7	15	0.6	18						
70											0.8	15	0.7	19	0.6	22						
80										1	12	0.8	17	0.7	22	0.6	26					
90										1	14	0.8	20	0.7	25	0.6	29					
100										0.9	17	0.8	23	0.7	28	0.6	33					
110									1.3	10	0.9	19	0.8	26	0.7	31	0.6	36				
120									1.3	12	0.9	21	0.8	29	0.7	35	0.6	40				
130								1.4	10	1.2	14	0.9	24	0.8	31	0.7	38	0.6	44			
140								1.4	12	1.2	16	0.9	26	0.8	34	0.7	41	0.6	47			
150								1.4	14	1.2	17	0.9	28	0.7	37	0.7	44	0.6	51			
160							1.6	11	1.3	16	1.2	19	0.9	31	0.7	40	0.7	47	0.6	54		
170							1.5	13	1.3	17	1.2	21	0.9	33	0.7	42	0.7	50	0.6	58		
180							1.5	14	1.3	19	1.2	23	0.9	35	0.7	45	0.6	54	0.6	62		
190						1.8	10	1.5	16	1.3	21	1.2	25	0.9	37	0.7	48	0.6	57	0.6	65	
200						1.8	12	1.5	17	1.3	22	1.2	26	0.9	39	0.7	50	0.6	60	0.6	69	
210						1.7	13	1.5	19	1.3	24	1.2	28	0.9	42	0.7	53	0.6	63	0.6	72	
220						1.7	14	1.5	20	1.3	25	1.2	30	0.9	44	0.7	56	0.6	66	0.6	76	
230						1.7	16	1.5	22	1.3	27	1.2	31	0.9	46	0.7	58	0.6	69	0.6	79	
240						1.7	17	1.4	23	1.3	28	1.2	33	0.9	48	0.7	61	0.6	73	0.6	83	
250					2.1	10	1.7	18	1.4	25	1.3	30	1.2	34	0.9	50	0.7	64	0.6	76	0.6	86
260					2.1	11	1.7	20	1.4	26	1.3	31	1.2	36	0.9	53	0.7	67	0.6	79	0.6	90
270					2.1	13	1.7	21	1.4	27	1.3	33	1.2	38	0.9	55	0.7	69	0.6	82	0.6	94
280					2	14	1.6	22	1.4	29	1.3	34	1.1	40	0.9	57	0.7	72	0.6	85	0.6	97
290					2	15	1.6	23	1.4	30	1.3	36	1.1	41	0.9	59	0.7	75	0.6	88		
300					2	16	1.6	25	1.4	31	1.3	37	1.1	43	0.9	61	0.7	77	0.6	91		
310					2	17	1.6	26	1.4	33	1.3	39	1.1	44	0.9	64	0.7	80	0.6	95		
320					2	18	1.6	27	1.4	34	1.3	40	1.1	46	0.9	66	0.7	83	0.6	98		
330					2	19	1.6	28	1.4	35	1.3	42	1.1	48	0.9	68	0.7	85				
340					2	21	1.6	29	1.4	37	1.3	43	1.1	49	0.9	70	0.7	88				
350					1.9	22	1.6	31	1.4	38	1.2	45	1.1	51	0.9	72	0.7	91				
360				2.6	10	1.9	23	1.6	32	1.4	39	1.2	46	1.1	52	0.9	75	0.7	93			
370				2.6	11	1.9	24	1.6	33	1.4	41	1.2	48	1.1	54	0.9	77	0.7	96			
380				2.6	12	1.9	25	1.6	34	1.4	42	1.2	49	1.1	56	0.9	79	0.7	99			
390				2.5	13	1.9	26	1.6	35	1.4	43	1.2	51	1.1	57	0.9	81					
400				2.5	14	1.9	27	1.6	36	1.4	45	1.2	52	1.1	59	0.9	83					
410				2.5	15	1.9	28	1.6	38	1.4	46	1.2	54	1.1	61	0.9	85					
420				2.5	16	1.9	29	1.6	39	1.4	47	1.2	55	1.1	62	0.9	88					
430				2.5	16	1.9	30	1.6	40	1.4	48	1.2	56	1.1	64	0.9	90					
440				2.5	17	1.9	31	1.6	41	1.4	50	1.2	58	1.1	65	0.9	92					
450				2.5	18	1.9	32	1.6	42	1.4	51	1.2	59	1.1	67	0.9	94					
460				2.4	19	1.9	33	1.6	43	1.4	52	1.2	61	1.1	69	0.9	96					
470				2.4	20	1.9	34	1.6	44	1.4	54	1.2	62	1.1	70	0.9	98					
480				2.4	21	1.9	35	1.6	45	1.4	55	1.2	64	1.1	72							
490				2.4	22	1.9	36	1.6	47	1.4	56	1.2	65	1.1	73							
500				2.4	23	1.9	37	1.6	48	1.4	58	1.2	67	1.1	75							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															
70															
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90															
100															
110															
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180															
190															
200															
210															
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230															
240															
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260															
270															
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290															
300															
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360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20													0.5	10	
30															
40															
50															
60															
70															
80															
90															
100															
110															
120															
130															
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190															
200															
210															
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240															
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370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
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50															
60															
70															
80															
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390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															
70															
80															
90															
100															
110															
120															
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170															
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330															
340															
350															
360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30													0.6	10	
40													0.6	15	
50													0.6	19	
60													0.6	24	
70													0.6	28	
80													0.6	32	
90													0.6	37	
100													0.6	41	
110													0.6	45	
120													0.6	50	
130													0.6	54	
140													0.6	58	
150													0.6	62	
160													0.6	67	
170													0.6	71	
180													0.6	75	
190													0.6	80	
200													0.6	84	
210													0.6	88	
220													0.6	92	
230													0.6	97	
240													0.6	89	
250													0.6	93	
260													0.6	97	
270													0.6	100	
280													0.6	85	
290													0.6	81	
300													0.6	77	
310													0.6	73	
320													0.6	69	
330													0.6	65	
340													0.6	61	
350													0.6	57	
360													0.6	53	
370													0.6	49	
380													0.6	45	
390													0.6	41	
400													0.6	37	
410													0.6	33	
420													0.6	29	
430													0.6	25	
440													0.6	21	
450													0.6	17	
460													0.6	13	
470													0.6	9	
480													0.6	5	
490													0.6	1	
500													0.6	0	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
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70															
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90															
100															
110															
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200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
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330															
340															
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360															
370															
380															
390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															0.5 10
40															0.5 13
50															0.5 17
60															0.5 21
70											0.9 11	0.8 11	0.7 11		0.5 25
80											0.9 13	0.8 16	0.7 16		
90										1.1 11	0.9 15	0.8 18	0.7 21		
100										1.1 12	0.9 17	0.8 21	0.7 24		
110										1.1 14	0.9 19	0.8 23	0.7 27		
120										1.1 16	0.9 21	0.8 25	0.7 29		
130									1.5 10	1.1 17	0.9 23	0.7 28	0.7 32		
140									1.5 11	1.1 19	0.9 25	0.7 30	0.7 35		
150								1.6 10	1.4 13	1.1 20	0.9 27	0.7 32	0.7 37		
160								1.6 11	1.4 14	1 22	0.9 29	0.7 34	0.7 40		
170								1.6 12	1.4 15	1 23	0.9 30	0.7 37	0.7 42		
180							1.8 10	1.6 13	1.4 16	1 25	0.9 32	0.7 39	0.7 45		
190							1.8 11	1.6 15	1.4 17	1 27	0.9 34	0.7 41	0.7 48		
200							1.8 12	1.6 16	1.4 18	1 28	0.9 36	0.7 43	0.7 50		
210							1.8 13	1.6 17	1.4 20	1 30	0.9 38	0.7 46	0.7 53		
220						2.1 10	1.8 14	1.5 18	1.4 21	1 31	0.9 40	0.7 48	0.7 55		
230						2.1 11	1.8 15	1.5 19	1.4 22	1 33	0.8 42	0.7 50	0.7 58		
240						2.1 12	1.7 16	1.5 20	1.4 23	1 34	0.8 44	0.7 52	0.7 60		
250						2 13	1.7 17	1.5 21	1.4 24	1 36	0.8 46	0.7 55	0.7 63		
260						2 14	1.7 18	1.5 22	1.4 25	1 37	0.8 48	0.7 57	0.7 66		
270						2 14	1.7 19	1.5 23	1.4 26	1 39	0.8 50	0.7 59	0.7 68		
280					2.5 10	2 15	1.7 20	1.5 24	1.4 28	1 40	0.8 52	0.7 62	0.7 71		
290					2.5 11	2 16	1.7 21	1.5 25	1.4 29	1 42	0.8 54	0.7 64	0.7 73		
300					2.5 11	2 17	1.7 22	1.5 26	1.4 30	1 44	0.8 55	0.7 66	0.7 76		
310					2.4 12	2 18	1.7 23	1.5 27	1.4 31	1 45	0.8 57	0.7 68	0.7 79		
320					2.4 13	2 18	1.7 23	1.5 28	1.4 32	1 47	0.8 59	0.7 71	0.7 81		
330					2.4 13	2 19	1.7 24	1.5 29	1.4 33	1 48	0.8 61	0.7 73	0.7 84		
340					2.4 14	2 20	1.7 25	1.5 30	1.4 34	1 50	0.8 63	0.7 75	0.7 86		
350					2.4 15	2 21	1.7 26	1.5 31	1.4 35	1 51	0.8 65	0.7 77	0.7 89		
360					2.4 15	2 22	1.7 27	1.5 32	1.4 37	1 53	0.8 67	0.7 80	0.7 92		
370					2.4 16	2 22	1.7 28	1.5 33	1.4 38	1 54	0.8 69	0.7 82	0.7 94		
380					2.4 17	2 23	1.7 29	1.5 34	1.4 39	1 56	0.8 71	0.7 84	0.7 97		
390					2.4 17	2 24	1.7 30	1.5 35	1.4 40	1 57	0.8 73	0.7 87	0.7 99		
400				3.1 10	2.4 18	1.9 25	1.7 31	1.5 36	1.3 41	1 59	0.8 75	0.7 89			
410				3.1 10	2.4 19	1.9 25	1.7 31	1.5 37	1.3 42	1 61	0.8 77	0.7 91			
420				3.1 11	2.4 19	1.9 26	1.7 32	1.5 38	1.3 43	1 62	0.8 78	0.7 93			
430				3.1 11	2.3 20	1.9 27	1.7 33	1.5 39	1.3 44	1 64	0.8 80	0.7 96			
440				3.1 12	2.3 21	1.9 28	1.7 34	1.5 40	1.3 45	1 65	0.8 82	0.7 98			
450				3.1 12	2.3 21	1.9 28	1.7 35	1.5 41	1.3 47	1 67	0.8 84	0.7 100			
460				3.1 13	2.3 22	1.9 29	1.7 36	1.5 42	1.3 48	1 68	0.8 86				
470				3.1 13	2.3 22	1.9 30	1.7 37	1.5 43	1.3 49	1 70	0.8 88				
480				3 14	2.3 23	1.9 31	1.7 38	1.5 44	1.3 50	1 71	0.8 90				
490				3 14	2.3 24	1.9 31	1.7 38	1.5 45	1.3 51	1 73	0.8 92				
500				3 15	2.3 24	1.9 32	1.7 39	1.5 46	1.3 52	1 74	0.8 94				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
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390															
400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															0.5 12
50														0.6 13	0.5 16
60													0.7 12	0.6 16	0.5 20
70												0.8 11	0.7 14	0.6 19	0.5 23
80											0.9 10	0.8 14	0.7 17	0.6 23	0.5 27
90											0.9 12	0.8 16	0.7 20	0.6 26	0.5 31
100											0.9 14	0.8 19	0.7 23	0.6 29	
110										1.1 10	0.9 16	0.8 21	0.7 25	0.6 32	
120										1.1 12	0.9 19	0.8 24	0.7 28	0.6 35	
130										1.1 14	0.9 21	0.8 26	0.7 31	0.6 39	
140										1.1 16	0.9 23	0.8 28	0.7 33	0.6 42	
150										1.1 17	0.9 25	0.8 31	0.7 36	0.6 45	
160										1.1 19	0.9 27	0.7 33	0.7 38	0.6 48	
170									1.5 10	1.1 21	0.9 29	0.7 35	0.7 41	0.6 52	
180									1.5 11	1.1 22	0.9 31	0.7 37	0.7 44	0.6 55	
190									1.5 13	1.1 24	0.9 33	0.7 40	0.7 46	0.6 58	
200								1.7 10	1.5 14	1.1 26	0.9 34	0.7 42	0.7 49	0.6 61	
210								1.7 11	1.5 15	1 27	0.9 36	0.7 44	0.7 51	0.6 64	
220								1.6 13	1.4 17	1 29	0.9 38	0.7 47	0.7 54	0.6 67	
230								1.6 14	1.4 18	1 31	0.9 40	0.7 49	0.7 57	0.6 71	
240							1.9 10	1.6 15	1.4 19	1 32	0.9 42	0.7 51	0.7 59	0.6 74	
250							1.9 11	1.6 16	1.4 20	1 34	0.9 44	0.7 53	0.7 62	0.6 77	
260							1.8 12	1.6 17	1.4 22	1 35	0.9 46	0.7 56	0.7 65	0.6 80	
270							1.8 13	1.6 19	1.4 23	1 37	0.9 48	0.7 58	0.7 67	0.6 83	
280							1.8 14	1.6 20	1.4 24	1 38	0.8 50	0.7 60	0.7 70	0.6 86	
290							1.8 15	1.6 21	1.4 25	1 40	0.8 52	0.7 63	0.7 72	0.6 90	
300							1.8 16	1.5 22	1.4 27	1 42	0.8 54	0.7 65	0.7 75	0.6 93	
310						2.1 11	1.8 18	1.5 23	1.4 28	1 43	0.8 56	0.7 67	0.7 78	0.6 96	
320						2.1 11	1.8 19	1.5 24	1.4 29	1 45	0.8 58	0.7 69	0.7 80	0.6 99	
330						2.1 13	1.8 20	1.5 25	1.4 30	1 46	0.8 60	0.7 72	0.7 83		
340						2.1 13	1.7 21	1.5 26	1.4 31	1 48	0.8 62	0.7 74	0.7 85		
350						2.1 14	1.7 22	1.5 27	1.4 32	1 49	0.8 64	0.7 76	0.7 88		
360						2.1 15	1.7 23	1.5 28	1.4 34	1 51	0.8 66	0.7 79	0.7 90		
370						2 16	1.7 23	1.5 29	1.4 35	1 53	0.8 67	0.7 81	0.7 93		
380						2 17	1.7 24	1.5 31	1.4 36	1 54	0.8 69	0.7 83	0.7 96		
390						2 18	1.7 25	1.5 32	1.4 37	1 56	0.8 71	0.7 85	0.7 98		
400						2 19	1.7 26	1.5 33	1.4 38	1 57	0.8 73	0.7 88			
410					2.5 10	2 20	1.7 27	1.5 34	1.4 39	1 59	0.8 75	0.7 90			
420					2.5 11	2 21	1.7 28	1.5 35	1.4 41	1 60	0.8 77	0.7 92			
430					2.5 12	2 22	1.7 29	1.5 36	1.4 42	1 62	0.8 79	0.7 94			
440					2.5 12	2 22	1.7 30	1.5 37	1.4 43	1 63	0.8 81	0.7 97			
450					2.5 13	2 23	1.7 31	1.5 38	1.4 44	1 65	0.8 83	0.7 99			
460					2.5 14	2 24	1.7 32	1.5 39	1.3 45	1 67	0.8 85				
470					2.5 15	2 25	1.7 33	1.5 40	1.3 46	1 68	0.8 87				
480					2.4 16	2 26	1.7 34	1.5 41	1.3 47	1 70	0.8 89				
490					2.4 16	2 27	1.7 35	1.5 42	1.3 48	1 71	0.8 91				
500					2.4 17	2 28	1.7 36	1.5 43	1.3 50	1 73	0.8 92				

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 12
60														0.7 12	0.6 14
70													0.8 10	0.7 14	0.6 17
80												0.9 10	0.8 12	0.7 16	0.6 20
90												0.9 12	0.8 14	0.7 18	0.6 22
100											1.1 10	0.9 13	0.8 16	0.7 21	0.6 25
110											1.1 12	0.9 15	0.8 18	0.7 23	0.6 28
120											1.1 13	0.9 17	0.8 20	0.7 25	0.6 30
130										1.3 10	1.1 14	0.9 18	0.8 22	0.6 28	0.6 33
140										1.3 11	1 16	0.9 20	0.8 23	0.6 30	0.6 36
150										1.3 12	1 17	0.9 21	0.8 25	0.6 32	0.6 38
160										1.3 13	1 18	0.9 23	0.8 27	0.6 34	0.6 41
170										1.3 14	1 20	0.9 25	0.8 29	0.6 37	0.6 44
180										1.3 15	1 21	0.9 26	0.8 31	0.6 39	0.6 46
190										1.3 16	1 22	0.9 28	0.8 32	0.6 41	0.6 49
200									1.8 10	1.3 17	1 24	0.9 29	0.8 34	0.6 43	0.6 51
210									1.8 10	1.3 19	1 25	0.9 31	0.8 36	0.6 46	0.6 54
220									1.8 11	1.3 20	1 26	0.9 32	0.8 38	0.6 48	0.6 57
230									1.8 12	1.3 21	1 28	0.9 34	0.8 40	0.6 50	0.6 59
240							2 10		1.8 13	1.3 22	1 29	0.9 36	0.8 42	0.6 52	0.6 62
250							2 11		1.8 14	1.3 23	1 30	0.9 37	0.8 43	0.6 55	0.6 65
260							2 11		1.7 14	1.2 24	1 32	0.9 39	0.8 45	0.6 57	0.6 67
270							2 12		1.7 15	1.2 25	1 33	0.9 40	0.8 47	0.6 59	0.6 70
280							2 13		1.7 16	1.2 26	1 34	0.9 42	0.8 49	0.6 61	0.6 73
290						2.2 10	1.9 14		1.7 17	1.2 27	1 36	0.9 43	0.8 51	0.6 64	0.6 75
300						2.2 11	1.9 14		1.7 17	1.2 28	1 37	0.9 45	0.8 52	0.6 66	0.6 78
310						2.2 11	1.9 15		1.7 18	1.2 29	1 38	0.9 47	0.8 54	0.6 68	0.6 80
320						2.2 12	1.9 16		1.7 19	1.2 30	1 40	0.9 48	0.8 56	0.6 70	0.6 83
330						2.2 13	1.9 16		1.7 20	1.2 31	1 41	0.9 50	0.8 58	0.6 73	0.6 86
340						2.2 13	1.9 17		1.7 21	1.2 32	1 42	0.9 51	0.8 60	0.6 75	0.6 88
350						2.2 14	1.9 18		1.7 21	1.2 33	1 44	0.9 53	0.8 61	0.6 77	0.6 91
360					2.6 10	2.2 14	1.9 18		1.7 22	1.2 34	1 45	0.9 55	0.8 63	0.6 79	0.6 94
370					2.6 10	2.2 15	1.9 19		1.7 23	1.2 35	1 46	0.9 56	0.8 65	0.6 82	0.6 96
380					2.6 11	2.2 16	1.9 20		1.7 24	1.2 36	1 48	0.9 58	0.8 67	0.6 84	0.6 99
390					2.6 11	2.2 16	1.9 20		1.7 24	1.2 38	1 49	0.9 59	0.8 69	0.6 86	
400					2.6 12	2.2 17	1.9 21		1.7 25	1.2 39	1 50	0.9 61	0.8 71	0.6 88	
410					2.6 13	2.2 17	1.9 22		1.7 26	1.2 40	1 52	0.9 62	0.8 72	0.6 91	
420					2.6 13	2.2 18	1.9 23		1.7 27	1.2 41	1 53	0.9 64	0.8 74	0.6 93	
430					2.5 14	2.1 19	1.9 23		1.7 27	1.2 42	1 54	0.9 66	0.8 76	0.6 95	
440					2.5 14	2.1 19	1.9 24		1.7 28	1.2 43	1 56	0.9 67	0.8 78	0.6 97	
450					2.5 15	2.1 20	1.9 25		1.7 29	1.2 44	1 57	0.9 69	0.8 80	0.6 99	
460					2.5 15	2.1 20	1.9 25		1.7 30	1.2 45	1 58	0.9 70	0.8 81		
470					2.5 16	2.1 21	1.9 26		1.7 30	1.2 46	1 59	0.9 72	0.8 83		
480					3.1 10	2.5 16	2.1 22	1.9 27	1.7 31	1.2 47	1 61	0.9 73	0.8 85		
490					3.1 10	2.5 17	2.1 22	1.9 27	1.7 32	1.2 48	1 62	0.9 75	0.8 87		
500					3.1 11	2.5 17	2.1 23	1.9 28	1.7 33	1.2 49	1 63	0.9 76	0.8 89		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 11
60														0.7 11	0.6 14
70														0.7 13	0.6 16
80													0.8 11	0.7 15	0.6 19
90												0.9 10	0.8 13	0.7 18	0.6 22
100												0.9 12	0.8 15	0.7 20	0.6 24
110											1.1 10	0.9 14	0.8 17	0.7 22	0.6 27
120											1.1 11	0.9 15	0.8 19	0.7 25	0.6 30
130											1.1 13	0.9 17	0.8 21	0.7 27	0.6 32
140											1.1 14	0.9 19	0.8 22	0.7 29	0.6 35
150										1.4 10	1.1 16	0.9 20	0.8 24	0.6 31	0.6 38
160										1.3 11	1 17	0.9 22	0.8 26	0.6 34	0.6 40
170										1.3 12	1 18	0.9 24	0.8 28	0.6 36	0.6 43
180										1.3 14	1 20	0.9 25	0.8 30	0.6 38	0.6 46
190										1.3 15	1 21	0.9 27	0.8 32	0.6 40	0.6 48
200										1.3 16	1 23	0.9 28	0.8 34	0.6 43	0.6 51
210										1.3 17	1 24	0.9 30	0.8 35	0.6 45	0.6 54
220										1.3 18	1 25	0.9 32	0.8 37	0.6 47	0.6 56
230										1.3 19	1 27	0.9 33	0.8 39	0.6 50	0.6 59
240								1.8 10	1.3 20	1 28	0.9 35	0.8 41	0.6 52	0.6 62	
250								1.8 11	1.3 21	1 29	0.9 36	0.8 43	0.6 54	0.6 64	
260								1.8 12	1.3 22	1 31	0.9 38	0.8 45	0.6 56	0.6 67	
270								1.8 12	1.3 24	1 32	0.9 40	0.8 46	0.6 59	0.6 70	
280								1.8 13	1.3 25	1 33	0.9 41	0.8 48	0.6 61	0.6 72	
290							2 10	1.8 14	1.3 26	1 35	0.9 43	0.8 50	0.6 63	0.6 75	
300							2 11	1.8 15	1.2 27	1 36	0.9 44	0.8 52	0.6 65	0.6 77	
310							2 12	1.7 16	1.2 28	1 37	0.9 46	0.8 54	0.6 68	0.6 80	
320							2 13	1.7 17	1.2 29	1 39	0.9 48	0.8 55	0.6 70	0.6 83	
330							2 13	1.7 18	1.2 30	1 40	0.9 49	0.8 57	0.6 72	0.6 85	
340							2 14	1.7 18	1.2 31	1 41	0.9 51	0.8 59	0.6 74	0.6 88	
350						2.3 10	1.9 15	1.7 19	1.2 32	1 43	0.9 52	0.8 61	0.6 77	0.6 91	
360						2.3 11	1.9 16	1.7 20	1.2 33	1 44	0.9 54	0.8 63	0.6 79	0.6 93	
370						2.2 12	1.9 16	1.7 21	1.2 34	1 45	0.9 55	0.8 64	0.6 81	0.6 96	
380						2.2 12	1.9 17	1.7 22	1.2 35	1 47	0.9 57	0.8 66	0.6 83	0.6 99	
390						2.2 13	1.9 18	1.7 22	1.2 36	1 48	0.9 59	0.8 68	0.6 86		
400						2.2 14	1.9 19	1.7 23	1.2 37	1 49	0.9 60	0.8 70	0.6 88		
410						2.2 14	1.9 19	1.7 24	1.2 38	1 51	0.9 62	0.8 72	0.6 90		
420						2.2 15	1.9 20	1.7 25	1.2 40	1 52	0.9 63	0.8 74	0.6 92		
430						2.2 16	1.9 21	1.7 25	1.2 41	1 53	0.9 65	0.8 75	0.6 95		
440						2.6 10	2.2 16	1.9 22	1.7 26	1 55	0.9 66	0.8 77	0.6 97		
450						2.6 10	2.2 17	1.9 22	1.7 27	1 56	0.9 68	0.8 79	0.6 99		
460						2.6 11	2.2 17	1.9 23	1.7 28	1 57	0.9 70	0.8 81			
470						2.6 11	2.2 18	1.9 24	1.7 28	1 59	0.9 71	0.8 83			
480						2.6 12	2.2 19	1.9 24	1.7 29	1 60	0.9 73	0.8 84			
490						2.6 13	2.2 19	1.9 25	1.7 30	1 61	0.9 74	0.8 86			
500						2.6 13	2.1 20	1.9 26	1.7 31	1 63	0.9 76	0.8 88			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.87

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 10
60														0.7 10	0.6 13
70														0.7 12	0.6 16
80													0.9 10	0.7 15	0.6 18
90													0.8 12	0.7 17	0.6 21
100												1 10	0.8 14	0.7 19	0.6 24
110												0.9 12	0.8 16	0.7 22	0.6 26
120												0.9 14	0.8 18	0.7 24	0.6 29
130											1.1 11	0.9 16	0.8 20	0.7 26	0.6 32
140											1.1 13	0.9 17	0.8 22	0.7 29	0.6 34
150											1.1 14	0.9 19	0.8 23	0.7 31	0.6 37
160											1.1 16	0.9 21	0.8 25	0.6 33	0.6 40
170										1.4 10	1.1 17	0.9 22	0.8 27	0.6 35	0.6 42
180										1.4 11	1.1 19	0.9 24	0.8 29	0.6 38	0.6 45
190										1.3 12	1 20	0.9 26	0.8 31	0.6 40	0.6 48
200										1.3 14	1 21	0.9 27	0.8 33	0.6 42	0.6 51
210										1.3 15	1 23	0.9 29	0.8 35	0.6 44	0.6 53
220										1.3 16	1 24	0.9 31	0.8 36	0.6 47	0.6 56
230										1.3 17	1 25	0.9 32	0.8 38	0.6 49	0.6 58
240										1.3 18	1 27	0.9 34	0.8 40	0.6 51	0.6 61
250										1.3 20	1 28	0.9 36	0.8 42	0.6 54	0.6 64
260										1.3 21	1 30	0.9 37	0.8 44	0.6 56	0.6 66
270										1.3 22	1 31	0.9 39	0.8 46	0.6 58	0.6 69
280								1.9 10	1.3 23	1 32	0.9 40	0.8 47	0.6 60	0.6 72	
290								1.8 11	1.3 24	1 34	0.9 42	0.8 49	0.6 63	0.6 74	
300								1.8 12	1.3 25	1 35	0.9 43	0.8 51	0.6 65	0.6 77	
310								1.8 13	1.3 26	1 36	0.9 45	0.8 53	0.6 67	0.6 80	
320								1.8 14	1.3 27	1 38	0.9 47	0.8 55	0.6 69	0.6 82	
330								2.1 10	1.8 15	1.3 29	1 39	0.9 48	0.8 57	0.6 72	0.6 85
340								2 10	1.8 15	1.2 30	1 41	0.9 50	0.8 58	0.6 74	0.6 88
350								2 11	1.8 16	1.2 31	1 42	0.9 51	0.8 60	0.6 76	0.6 90
360								2 12	1.8 17	1.2 32	1 43	0.9 53	0.8 62	0.6 78	0.6 93
370								2 13	1.7 18	1.2 33	1 44	0.9 55	0.8 64	0.6 81	0.6 96
380								2 14	1.7 19	1.2 34	1 46	0.9 56	0.8 66	0.6 83	0.6 98
390								2 15	1.7 20	1.2 35	1 47	0.9 58	0.8 68	0.6 85	
400								2 16	1.7 21	1.2 36	1 48	0.9 59	0.8 69	0.6 87	
410							2.3 10	2 16	1.7 21	1.2 37	1 50	0.9 61	0.8 71	0.6 90	
420							2.3 11	1.9 17	1.7 22	1.2 38	1 51	0.9 63	0.8 73	0.6 92	
430							2.3 11	1.9 18	1.7 23	1.2 39	1 52	0.9 64	0.8 75	0.6 94	
440							2.3 12	1.9 19	1.7 24	1.2 40	1 54	0.9 66	0.8 77	0.6 96	
450							2.3 13	1.9 19	1.7 25	1.2 42	1 55	0.9 67	0.8 79	0.6 99	
460							2.2 14	1.9 20	1.7 26	1.2 43	1 56	0.9 69	0.8 80		
470							2.2 14	1.9 21	1.7 26	1.2 44	1 58	0.9 70	0.8 82		
480							2.2 15	1.9 22	1.7 27	1.2 45	1 59	0.9 72	0.8 84		
490							2.2 16	1.9 22	1.7 28	1.2 46	1 60	0.9 74	0.8 86		
500							2.2 16	1.9 23	1.7 29	1.2 47	1 62	0.9 75	0.8 88		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40												0.8 10	0.7 13	0.6 11	0.5 13
50												0.8 13	0.7 17	0.6 16	0.5 18
60												0.8 16	0.7 21	0.6 20	0.5 23
70								1.2 11	1 13	0.8 19	0.7 24	0.6 24	0.5 28		
80								1.3 11	1 15	0.8 22	0.7 28	0.6 29	0.5 33		
90						1.5 10	1.3 13	1.1 16	1 18	0.8 26	0.7 32	0.6 33	0.5 38		
100						1.4 12	1.2 15	1.1 18	1 20	0.8 29	0.7 36	0.6 38	0.5 43		
110					1.7 10	1.4 14	1.2 17	1.1 20	1 23	0.8 32	0.7 39	0.6 42	0.5 48		
120					1.7 11	1.4 15	1.2 19	1.1 22	1 25	0.8 35	0.7 43	0.6 46	0.5 53		
130					1.7 13	1.4 17	1.2 21	1.1 24	1 27	0.8 38	0.6 47	0.6 51	0.5 57		
140					1.6 14	1.4 19	1.2 23	1.1 26	1 29	0.8 41	0.6 51	0.6 55	0.5 62		
150				2.1 10	1.6 16	1.4 20	1.2 25	1.1 28	1 32	0.8 44	0.6 54	0.6 59	0.5 67		
160				2.1 11	1.6 17	1.4 22	1.2 26	1.1 30	1 34	0.8 47	0.6 58	0.6 62	0.5 72		
170				2 12	1.6 19	1.3 24	1.2 28	1.1 33	1 36	0.8 50	0.6 62	0.6 68	0.5 77		
180				2 13	1.6 20	1.3 25	1.2 30	1.1 35	1 39	0.8 53	0.6 66	0.6 72	0.5 82		
190				2 15	1.6 21	1.3 27	1.2 32	1.1 37	1 41	0.8 56	0.6 69	0.6 77	0.5 87		
200				2 16	1.6 23	1.3 29	1.2 34	1.1 39	1 43	0.8 59	0.6 73	0.6 81	0.5 92		
210				2 17	1.6 24	1.3 30	1.2 36	1.1 41	1 46	0.8 62	0.6 77	0.6 86	0.5 97		
220				2 18	1.6 26	1.3 32	1.2 38	1.1 43	1 48	0.8 66	0.6 81	0.6 90			
230				2 19	1.6 27	1.3 34	1.2 40	1.1 45	1 50	0.8 69	0.6 84	0.6 94			
240			2.8 10	1.9 20	1.6 28	1.3 35	1.2 42	1.1 47	1 53	0.8 72	0.6 88	0.6 98			
250			2.8 11	1.9 21	1.5 30	1.3 37	1.2 43	1.1 49	1 55	0.8 75	0.6 92				
260			2.8 11	1.9 23	1.5 31	1.3 38	1.2 45	1.1 51	1 57	0.8 78	0.6 96				
270			2.7 12	1.9 24	1.5 32	1.3 40	1.2 47	1.1 53	1 60	0.8 81	0.6 99				
280			2.7 13	1.9 25	1.5 34	1.3 42	1.2 49	1.1 56	1 62	0.8 84					
290			2.7 14	1.9 26	1.5 35	1.3 43	1.2 51	1 58	1 64	0.8 87					
300			2.7 15	1.9 27	1.5 37	1.3 45	1.2 53	1 60	1 66	0.8 90					
310			2.7 16	1.9 28	1.5 38	1.3 47	1.2 55	1 62	1 69	0.8 93					
320			2.7 17	1.9 29	1.5 39	1.3 48	1.2 56	1 64	1 71	0.8 96					
330			2.7 17	1.9 30	1.5 41	1.3 50	1.2 58	1 66	1 73	0.8 99					
340			2.6 18	1.9 31	1.5 42	1.3 51	1.2 60	1 68	1 76						
350			2.6 19	1.9 32	1.5 43	1.3 53	1.2 62	1 70	1 78						
360			2.6 20	1.9 34	1.5 45	1.3 55	1.2 64	1 72	1 80						
370			2.6 21	1.9 35	1.5 46	1.3 56	1.2 66	1 74	1 82						
380			2.6 22	1.9 36	1.5 47	1.3 58	1.2 67	1 76	1 85						
390			2.6 22	1.9 37	1.5 49	1.3 59	1.2 69	1 78	1 87						
400			2.6 23	1.9 38	1.5 50	1.3 61	1.2 71	1 81	1 89						
410			2.6 24	1.9 39	1.5 52	1.3 63	1.2 73	1 83	1 92						
420			2.6 25	1.9 40	1.5 53	1.3 64	1.2 75	1 85	1 94						
430			2.6 26	1.9 41	1.5 54	1.3 66	1.1 77	1 87	1 96						
440			2.6 26	1.9 42	1.5 56	1.3 68	1.1 79	1 89	1 99						
450			2.6 27	1.9 43	1.5 57	1.3 69	1.1 81	1 91							
460			2.6 28	1.9 44	1.5 58	1.3 71	1.1 82	1 93							
470			2.6 29	1.9 45	1.5 60	1.3 72	1.1 84	1 95							
480			2.6 29	1.9 47	1.5 61	1.3 74	1.1 86	1 97							
490			2.6 30	1.9 48	1.5 62	1.3 76	1.1 88	1 99							
500			2.5 31	1.9 49	1.5 64	1.3 77	1.1 90								

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50													0.6 10	0.6 12	
60													0.6 15	0.5 17	
70												0.8 12	0.6 19	0.5 22	
80											0.8 15	0.7 20	0.6 24	0.5 27	
90									1.1 11	0.8 18	0.7 24	0.6 28	0.5 32		
100								1.2 12	1 14	0.8 21	0.7 27	0.6 33	0.5 37		
110							1.3 11	1.1 14	1 16	0.8 25	0.7 31	0.6 37	0.5 42		
120							1.3 13	1.1 16	1 19	0.8 28	0.7 35	0.6 41	0.5 47		
130						1.5 11	1.3 15	1.1 18	1 21	0.8 31	0.7 39	0.6 46	0.5 52		
140						1.4 13	1.2 17	1.1 21	1 24	0.8 34	0.7 43	0.6 50	0.5 57		
150					1.7 10	1.4 15	1.2 19	1.1 23	1 26	0.8 37	0.7 46	0.6 54	0.5 62		
160					1.7 11	1.4 17	1.2 21	1.1 25	1 28	0.8 40	0.6 50	0.6 59	0.5 67		
170					1.7 13	1.4 19	1.2 23	1.1 27	1 31	0.8 43	0.6 54	0.6 63	0.5 72		
180					1.7 15	1.4 20	1.2 25	1.1 29	1 33	0.8 46	0.6 58	0.6 68	0.5 77		
190					1.6 16	1.4 22	1.2 27	1.1 31	1 35	0.8 49	0.6 61	0.6 72	0.5 81		
200					1.6 18	1.4 24	1.2 29	1.1 34	1 38	0.8 53	0.6 65	0.6 76	0.5 86		
210				2.1 11	1.6 19	1.4 25	1.2 31	1.1 36	1 40	0.8 56	0.6 69	0.6 81	0.5 91		
220				2.1 12	1.6 21	1.3 27	1.2 33	1.1 38	1 42	0.8 59	0.6 73	0.6 85	0.5 96		
230				2 14	1.6 22	1.3 29	1.2 35	1.1 40	1 45	0.8 62	0.6 76	0.6 89			
240				2 15	1.6 24	1.3 30	1.2 36	1.1 42	1 47	0.8 65	0.6 80	0.6 94			
250				2 16	1.6 25	1.3 32	1.2 38	1.1 44	1 49	0.8 68	0.6 84	0.6 98			
260				2 17	1.6 26	1.3 34	1.2 40	1.1 46	1 52	0.8 71	0.6 88				
270				2 19	1.6 28	1.3 35	1.2 42	1.1 48	1 54	0.8 74	0.6 91				
280				2 20	1.6 29	1.3 37	1.2 44	1.1 50	1 56	0.8 77	0.6 95				
290				2 21	1.6 31	1.3 39	1.2 46	1.1 52	1 59	0.8 80	0.6 99				
300				2 22	1.6 32	1.3 40	1.2 48	1.1 55	1 61	0.8 83					
310				1.9 23	1.5 33	1.3 42	1.2 50	1.1 57	1 63	0.8 86					
320			2.9 10	1.9 24	1.5 35	1.3 44	1.2 52	1.1 59	1 66	0.8 90					
330			2.8 11	1.9 26	1.5 36	1.3 45	1.2 53	1.1 61	1 68	0.8 93					
340			2.8 12	1.9 27	1.5 38	1.3 47	1.2 55	1 63	1 70	0.8 96					
350			2.8 13	1.9 28	1.5 39	1.3 49	1.2 57	1 65	1 72	0.8 99					
360			2.8 14	1.9 29	1.5 40	1.3 50	1.2 59	1 67	1 75						
370			2.7 15	1.9 30	1.5 42	1.3 52	1.2 61	1 69	1 77						
380			2.7 16	1.9 31	1.5 43	1.3 53	1.2 63	1 71	1 80						
390			2.7 17	1.9 32	1.5 45	1.3 55	1.2 65	1 73	1 82						
400			2.7 18	1.9 34	1.5 46	1.3 57	1.2 67	1 76	1 84						
410			2.7 19	1.9 35	1.5 47	1.3 58	1.2 68	1 78	1 86						
420			2.7 20	1.9 36	1.5 49	1.3 60	1.2 70	1 80	1 89						
430			2.7 21	1.9 37	1.5 50	1.3 62	1.2 72	1 82	1 91						
440			2.6 22	1.9 38	1.5 51	1.3 63	1.2 74	1 84	1 93						
450			2.6 23	1.9 39	1.5 53	1.3 65	1.2 76	1 86	1 96						
460			2.6 24	1.9 40	1.5 54	1.3 66	1.2 78	1 88	1 98						
470			2.6 25	1.9 41	1.5 56	1.3 68	1.2 80	1 90	1 100						
480			2.6 26	1.9 42	1.5 57	1.3 70	1.2 81	1 92							
490			2.6 27	1.9 44	1.5 58	1.3 71	1.1 83	1 94							
500			2.6 28	1.9 45	1.5 60	1.3 73	1.1 85	1 96							
				2.6 27	1.5 61	1.3 75	1.1 87	1 98							
				2.6 28	1.5 62	1.3 76	1.1 89	1 100							

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
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400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)									
10																								
20																								
30														0.5	11									
40												0.7	10	0.6	11									
50											0.8	10	0.7	13	0.5	15								
60											0.8	13	0.7	16	0.5	19								
70										1	11	0.8	15	0.7	19	0.5	23							
80										1	13	0.8	18	0.7	22	0.5	27							
90										1	16	0.8	20	0.7	25	0.5	31							
100									1.3	11	0.9	18	0.8	23	0.6	28	0.5	35						
110								1.4	10	1.3	13	0.9	20	0.8	25	0.6	32	0.5	39					
120								1.4	12	1.3	14	0.9	22	0.8	28	0.6	35	0.5	43					
130							1.6	11	1.4	13	1.2	16	0.9	24	0.8	30	0.6	38	0.5	47				
140							1.6	12	1.4	15	1.2	17	0.9	26	0.8	33	0.6	42	0.5	51				
150						1.8	10	1.5	13	1.4	16	1.2	19	0.9	35	0.7	45	0.6	55	0.5	59			
160						1.8	11	1.5	15	1.3	18	1.2	20	0.9	38	0.7	48	0.6	59	0.5	63			
170						1.8	12	1.5	16	1.3	19	1.2	22	0.9	40	0.7	51	0.6	63	0.5	67			
180						1.8	13	1.5	17	1.3	20	1.2	23	0.9	43	0.7	54	0.6	67	0.5	71			
190					2.1	10	1.7	14	1.5	18	1.3	22	1.2	25	0.9	45	0.7	57	0.6	71	0.5	76		
200					2.1	10	1.7	15	1.5	19	1.3	23	1.2	26	0.9	48	0.7	60	0.6	76	0.5	80		
210					2.1	11	1.7	16	1.5	21	1.3	24	1.2	28	0.9	50	0.7	63	0.6	80	0.5	84		
220					2.1	12	1.7	17	1.5	22	1.3	26	1.2	29	0.9	53	0.7	66	0.6	84	0.5	88		
230					2.1	13	1.7	19	1.5	23	1.3	27	1.2	31	0.9	56	0.7	69	0.6	88	0.5	92		
240					2.1	14	1.7	20	1.5	24	1.3	29	1.2	32	0.9	60	0.7	71	0.6	92	0.5	96		
250					2	15	1.7	21	1.5	26	1.3	30	1.2	34	0.9	63	0.7	74	0.6	96	0.5	100		
260					2	16	1.7	22	1.5	27	1.3	31	1.2	35	0.9	66	0.7	77	0.6	100	0.5	100		
270				2.6	10	2	17	1.7	23	1.5	28	1.3	33	1.2	37	0.9	70	0.7	80	0.6	100	0.5	100	
280				2.6	10	2	18	1.7	24	1.5	29	1.3	34	1.2	38	0.9	73	0.7	83	0.6	100	0.5	100	
290				2.6	11	2	19	1.7	25	1.5	30	1.3	35	1.2	40	0.9	76	0.7	86	0.6	100	0.5	100	
300				2.6	12	2	20	1.7	26	1.5	31	1.3	37	1.2	41	0.9	79	0.7	89	0.6	100	0.5	100	
310				2.6	13	2	21	1.7	27	1.4	33	1.3	38	1.2	43	0.9	82	0.7	92	0.6	100	0.5	100	
320				2.6	13	2	21	1.7	28	1.4	34	1.3	39	1.2	44	0.9	85	0.7	95	0.6	100	0.5	100	
330				2.6	14	2	22	1.7	29	1.4	35	1.3	41	1.2	46	0.9	88	0.7	98	0.6	100	0.5	100	
340				2.6	15	2	23	1.7	30	1.4	36	1.3	42	1.2	47	0.9	91	0.7	100	0.6	100	0.5	100	
350				2.5	16	2	24	1.7	31	1.4	37	1.3	43	1.2	49	0.9	94	0.7	100	0.6	100	0.5	100	
360				2.5	16	2	25	1.7	32	1.4	39	1.3	45	1.2	50	0.9	97	0.7	100	0.6	100	0.5	100	
370				2.5	17	2	26	1.6	33	1.4	40	1.3	46	1.2	52	0.9	100	0.7	100	0.6	100	0.5	100	
380				2.5	18	2	27	1.6	34	1.4	41	1.3	47	1.2	53	0.9	100	0.7	100	0.6	100	0.5	100	
390				2.5	18	2	27	1.6	35	1.4	42	1.3	49	1.2	55	0.9	100	0.7	100	0.6	100	0.5	100	
400				2.5	19	2	28	1.6	36	1.4	43	1.3	50	1.2	56	0.9	100	0.7	100	0.6	100	0.5	100	
410				2.5	20	2	29	1.6	37	1.4	44	1.3	51	1.2	58	0.9	100	0.7	100	0.6	100	0.5	100	
420				2.5	20	1.9	30	1.6	38	1.4	46	1.3	53	1.2	59	0.9	100	0.7	100	0.6	100	0.5	100	
430				2.5	21	1.9	31	1.6	39	1.4	47	1.3	54	1.2	61	0.9	100	0.7	100	0.6	100	0.5	100	
440				2.5	22	1.9	32	1.6	40	1.4	48	1.3	55	1.2	62	0.9	100	0.7	100	0.6	100	0.5	100	
450				2.5	22	1.9	33	1.6	41	1.4	49	1.3	57	1.2	64	0.9	100	0.7	100	0.6	100	0.5	100	
460			3.6	10	2.5	23	1.9	33	1.6	42	1.4	50	1.3	58	1.2	65	0.9	100	0.7	100	0.6	100	0.5	100
470			3.6	10	2.5	24	1.9	34	1.6	43	1.4	51	1.3	59	1.2	66	0.9	100	0.7	100	0.6	100	0.5	100
480			3.6	11	2.5	24	1.9	35	1.6	44	1.4	53	1.3	61	1.2	68	0.9	100	0.7	100	0.6	100	0.5	100
490			3.6	11	2.5	25	1.9	36	1.6	45	1.4	54	1.3	62	1.2	69	0.9	100	0.7	100	0.6	100	0.5	100
500			3.6	12	2.5	26	1.9	37	1.6	46	1.4	55	1.3	63	1.2	71	0.9	100	0.7	100	0.6	100	0.5	100

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40														0.6 10	0.5 14
50												0.7 12	0.6 14	0.5 18	
60										1 10	0.8 12	0.7 15	0.6 18	0.5 22	
70										1 12	0.8 14	0.7 18	0.6 21	0.5 26	
80										1 14	0.8 17	0.7 21	0.6 24	0.5 30	
90										1 16	0.8 19	0.7 24	0.6 28	0.5 35	
100										0.9 19	0.8 22	0.7 27	0.6 31	0.5 39	
110									1.3 11	0.9 21	0.8 25	0.7 30	0.6 34	0.5 43	
120									1.3 12	0.9 23	0.8 27	0.7 33	0.6 38	0.5 47	
130								1.4 11	1.3 14	0.9 25	0.8 30	0.7 36	0.6 41	0.5 51	
140								1.4 13	1.3 16	0.9 27	0.8 32	0.7 39	0.6 44	0.5 55	
150							1.6 11	1.4 14	1.2 17	0.9 29	0.8 35	0.7 42	0.6 48	0.5 59	
160							1.6 12	1.4 16	1.2 19	0.9 31	0.8 37	0.7 44	0.6 51	0.5 63	
170							1.6 13	1.4 17	1.2 20	0.9 33	0.8 40	0.7 47	0.6 54	0.5 67	
180						1.8 10	1.5 15	1.4 19	1.2 22	0.9 35	0.8 42	0.7 50	0.6 58	0.5 71	
190						1.8 11	1.5 16	1.3 20	1.2 24	0.9 37	0.8 45	0.7 53	0.6 61	0.5 75	
200						1.8 12	1.5 17	1.3 21	1.2 25	0.9 39	0.8 47	0.7 56	0.6 64	0.5 79	
210						1.8 14	1.5 19	1.3 23	1.2 27	0.9 41	0.8 50	0.7 59	0.6 68	0.5 83	
220						1.8 15	1.5 20	1.3 24	1.2 28	0.9 43	0.8 52	0.7 62	0.6 71	0.5 87	
230						1.7 16	1.5 21	1.3 26	1.2 30	0.9 45	0.8 55	0.7 65	0.6 74	0.5 91	
240					2.1 11	1.7 17	1.5 22	1.3 27	1.2 31	0.9 47	0.8 57	0.7 68	0.6 78	0.5 95	
250					2.1 12	1.7 18	1.5 24	1.3 28	1.2 33	0.9 49	0.8 60	0.7 71	0.6 81	0.5 99	
260					2.1 13	1.7 19	1.5 25	1.3 30	1.2 34	0.9 51	0.8 62	0.7 74	0.6 84		
270					2.1 14	1.7 21	1.5 26	1.3 31	1.2 36	0.9 53	0.8 65	0.7 77	0.6 88		
280					2.1 15	1.7 22	1.5 27	1.3 33	1.2 37	0.9 55	0.8 67	0.7 80	0.6 91		
290					2.1 16	1.7 23	1.5 29	1.3 34	1.2 39	0.9 57	0.8 70	0.7 83	0.6 94		
300					2.1 17	1.7 24	1.5 30	1.3 35	1.2 40	0.9 59	0.8 72	0.7 85	0.6 98		
310					2 18	1.7 25	1.5 31	1.3 37	1.2 42	0.9 61	0.8 75	0.7 88			
320					2 18	1.7 26	1.5 32	1.3 38	1.2 43	0.9 62	0.8 77	0.7 91			
330					2 19	1.7 27	1.5 34	1.3 39	1.2 45	0.9 64	0.8 80	0.7 94			
340					2 20	1.7 28	1.5 35	1.3 41	1.2 46	0.9 66	0.8 82	0.7 97			
350				2.7 10	2 21	1.7 29	1.4 36	1.3 42	1.2 48	0.9 68	0.8 85	0.7 100			
360				2.6 12	2 22	1.7 30	1.4 37	1.3 43	1.2 49	0.9 70	0.8 87				
370				2.6 13	2 23	1.7 31	1.4 38	1.3 45	1.2 51	0.9 72	0.8 90				
380				2.6 13	2 24	1.7 32	1.4 39	1.3 46	1.2 52	0.9 74	0.8 92				
390				2.6 14	2 25	1.7 33	1.4 41	1.3 47	1.2 54	0.9 76	0.8 95				
400				2.6 15	2 26	1.7 34	1.4 42	1.3 49	1.2 55	0.9 78	0.8 97				
410				2.6 16	2 27	1.6 35	1.4 43	1.3 50	1.2 57	0.9 80	0.8 100				
420				2.6 17	2 28	1.6 37	1.4 44	1.3 51	1.2 58	0.9 82					
430				2.5 17	2 28	1.6 37	1.4 46	1.3 53	1.2 60	0.9 84					
440				2.5 18	2 29	1.6 39	1.4 47	1.3 54	1.2 61	0.9 86					
450				2.5 19	2 30	1.6 40	1.4 48	1.3 55	1.2 63	0.9 88					
460				2.5 20	2 31	1.6 41	1.4 49	1.3 57	1.2 64	0.9 90					
470				2.5 20	2 32	1.6 42	1.4 50	1.3 58	1.2 66	0.9 92					
480				2.5 21	1.9 33	1.6 43	1.4 51	1.3 59	1.2 67	0.9 94					
490				2.5 22	1.9 34	1.6 44	1.4 53	1.3 61	1.2 68	0.9 96					
500				2.5 22	1.9 35	1.6 45	1.4 54	1.3 62	1.2 70	0.9 98					

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
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400															
410															
420															
430															
440															
450															
460															
470															
480															
490															
500															

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															0.6 10
50														0.7 10	0.6 13
60														0.7 13	0.6 16
70													0.8 12	0.6 15	0.6 18
80												0.9 11	0.8 14	0.6 18	0.6 21
90											1 10	0.9 13	0.8 16	0.6 20	0.6 24
100											1 11	0.9 15	0.8 18	0.6 23	0.6 27
110											1 13	0.9 16	0.8 20	0.6 25	0.5 30
120										1.3 10	1 14	0.9 18	0.8 22	0.6 28	0.5 33
130										1.3 11	1 16	0.9 20	0.8 24	0.6 30	0.5 36
140										1.3 12	1 17	0.9 22	0.8 26	0.6 32	0.5 39
150										1.2 14	1 19	0.8 23	0.8 28	0.6 35	0.5 41
160										1.2 15	1 20	0.8 25	0.7 30	0.6 37	0.5 44
170										1.2 16	1 22	0.8 27	0.7 31	0.6 40	0.5 47
180									1.7 10	1.2 17	1 23	0.8 29	0.7 33	0.6 42	0.5 50
190									1.7 10	1.2 18	1 25	0.8 30	0.7 35	0.6 45	0.5 53
200									1.7 11	1.2 20	1 26	0.8 32	0.7 37	0.6 47	0.5 56
210								1.9 10	1.7 12	1.2 21	1 28	0.8 34	0.7 39	0.6 49	0.5 58
220								1.9 10	1.7 13	1.2 22	1 29	0.8 35	0.7 41	0.6 52	0.5 61
230								1.9 11	1.7 14	1.2 23	1 31	0.8 37	0.7 43	0.6 54	0.5 64
240								1.9 12	1.7 15	1.2 24	1 32	0.8 39	0.7 45	0.6 57	0.5 67
250								1.9 13	1.7 16	1.2 25	1 33	0.8 41	0.7 47	0.6 59	0.5 70
260						2.1 10	1.9 14	1.6 17	1.2 27	1 35	0.8 42	0.7 49	0.6 62	0.5 73	
270						2.1 11	1.8 14	1.6 17	1.2 28	1 36	0.8 44	0.7 51	0.6 64	0.5 76	
280						2.1 12	1.8 15	1.6 18	1.2 29	1 38	0.8 46	0.7 53	0.6 66	0.5 78	
290						2.1 12	1.8 16	1.6 19	1.2 30	1 39	0.8 48	0.7 55	0.6 69	0.5 81	
300						2.1 13	1.8 17	1.6 20	1.2 31	1 41	0.8 49	0.7 57	0.6 71	0.5 84	
310						2.1 14	1.8 17	1.6 21	1.2 32	1 42	0.8 51	0.7 59	0.6 74	0.5 87	
320						2.5 10	2.1 14	1.8 18	1.6 22	1.2 33	1 44	0.8 53	0.7 61	0.6 76	0.5 90
330						2.5 10	2.1 15	1.8 19	1.6 22	1.2 35	1 45	0.8 54	0.7 63	0.6 79	0.5 93
340						2.5 11	2.1 16	1.8 20	1.6 23	1.2 36	1 46	0.8 56	0.7 65	0.6 81	0.5 96
350						2.4 12	2.1 16	1.8 20	1.6 24	1.2 37	1 48	0.8 58	0.7 67	0.6 83	0.5 99
360						2.4 12	2.1 17	1.8 21	1.6 25	1.2 38	1 49	0.8 59	0.7 69	0.6 86	
370						2.4 13	2.1 18	1.8 22	1.6 26	1.2 39	1 51	0.8 61	0.7 71	0.6 88	
380						2.4 13	2 18	1.8 23	1.6 27	1.2 40	1 52	0.8 63	0.7 73	0.6 91	
390						2.4 14	2 19	1.8 23	1.6 27	1.2 41	1 54	0.8 65	0.7 75	0.6 93	
400						2.4 15	2 20	1.8 24	1.6 28	1.2 43	1 55	0.8 66	0.7 77	0.6 96	
410						2.4 15	2 20	1.8 25	1.6 29	1.2 44	1 56	0.8 68	0.7 79	0.6 98	
420						2.4 16	2 21	1.8 26	1.6 30	1.2 45	1 58	0.8 70	0.7 81	0.6 100	
430					3 10	2.4 16	2 22	1.8 26	1.6 31	1.2 46	1 59	0.8 71	0.7 83		
440					3 10	2.4 17	2 22	1.8 27	1.6 31	1.2 47	1 61	0.8 73	0.7 85		
450					2.9 11	2.4 17	2 23	1.8 28	1.6 32	1.2 48	1 62	0.8 75	0.7 87		
460					2.9 11	2.4 18	2 24	1.8 28	1.6 33	1.2 49	1 64	0.8 77	0.7 88		
470					2.9 12	2.4 18	2 24	1.8 29	1.6 34	1.2 51	1 65	0.8 78	0.7 90		
480					2.9 12	2.4 19	2 25	1.8 30	1.6 35	1.2 52	1 67	0.8 80	0.7 92		
490					2.9 13	2.4 20	2 25	1.8 31	1.6 35	1.2 53	1 68	0.8 82	0.7 94		
500					2.9 13	2.4 20	2 26	1.8 31	1.6 36	1.2 54	1 69	0.8 83	0.7 96		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 12
60														0.7 12	0.6 15
70													0.8 10	0.7 14	0.6 18
80												0.9 10	0.8 13	0.6 17	0.6 21
90												0.9 12	0.8 15	0.6 19	0.6 24
100											1.1 10	0.9 14	0.8 17	0.6 22	0.6 27
110											1 12	0.9 15	0.8 19	0.6 24	0.6 29
120											1 13	0.9 17	0.8 21	0.6 27	0.5 32
130											1 15	0.9 19	0.8 23	0.6 29	0.5 35
140										1.3 10	1 16	0.9 21	0.8 25	0.6 32	0.5 38
150										1.3 12	1 18	0.9 23	0.8 27	0.6 34	0.5 41
160										1.3 13	1 19	0.9 24	0.8 29	0.6 37	0.5 44
170										1.3 14	1 21	0.8 26	0.8 31	0.6 39	0.5 47
180										1.2 16	1 22	0.8 28	0.7 33	0.6 42	0.5 49
190										1.2 17	1 24	0.8 29	0.7 35	0.6 44	0.5 52
200										1.2 18	1 25	0.8 31	0.7 37	0.6 46	0.5 55
210										1.2 19	1 27	0.8 33	0.7 39	0.6 49	0.5 58
220									1.7 10	1.2 20	1 28	0.8 35	0.7 41	0.6 51	0.5 61
230									1.7 11	1.2 22	1 30	0.8 36	0.7 43	0.6 54	0.5 64
240									1.7 12	1.2 23	1 31	0.8 38	0.7 45	0.6 56	0.5 67
250								1.9 10	1.7 13	1.2 24	1 32	0.8 40	0.7 47	0.6 59	0.5 69
260								1.9 10	1.7 14	1.2 25	1 34	0.8 42	0.7 49	0.6 61	0.5 72
270								1.9 11	1.7 15	1.2 26	1 35	0.8 43	0.7 50	0.6 64	0.5 75
280								1.9 12	1.7 16	1.2 28	1 37	0.8 45	0.7 53	0.6 66	0.5 78
290								1.9 13	1.7 17	1.2 29	1 38	0.8 47	0.7 55	0.6 68	0.5 81
300								1.9 14	1.7 18	1.2 30	1 40	0.8 48	0.7 56	0.6 71	0.5 84
310							2.2 10	1.9 15	1.6 19	1.2 31	1 41	0.8 50	0.7 58	0.6 73	0.5 87
320							2.2 11	1.9 16	1.6 20	1.2 32	1 43	0.8 52	0.7 60	0.6 76	0.5 89
330							2.1 12	1.8 16	1.6 20	1.2 33	1 44	0.8 54	0.7 62	0.6 78	0.5 92
340							2.1 12	1.8 17	1.6 21	1.2 35	1 46	0.8 55	0.7 64	0.6 81	0.5 95
350							2.1 13	1.8 18	1.6 22	1.2 36	1 47	0.8 57	0.7 66	0.6 83	0.5 98
360							2.1 14	1.8 19	1.6 23	1.2 37	1 48	0.8 59	0.7 68	0.6 85	
370							2.1 15	1.8 20	1.6 24	1.2 38	1 50	0.8 60	0.7 70	0.6 88	
380							2.1 15	1.8 20	1.6 25	1.2 39	1 51	0.8 62	0.7 72	0.6 90	
390						2.5 10	2.1 16	1.8 21	1.6 26	1.2 40	1 53	0.8 64	0.7 74	0.6 93	
400						2.5 10	2.1 17	1.8 22	1.6 26	1.2 42	1 54	0.8 66	0.7 76	0.6 95	
410						2.5 11	2.1 17	1.8 23	1.6 27	1.2 43	1 56	0.8 67	0.7 78	0.6 98	
420						2.5 12	2.1 18	1.8 23	1.6 28	1.2 44	1 57	0.8 69	0.7 80	0.6 100	
430						2.5 12	2.1 19	1.8 24	1.6 29	1.2 45	1 59	0.8 71	0.7 82		
440						2.4 13	2 20	1.8 25	1.6 30	1.2 46	1 60	0.8 72	0.7 84		
450						2.4 14	2 20	1.8 26	1.6 31	1.2 47	1 61	0.8 74	0.7 86		
460						2.4 14	2 21	1.8 26	1.6 31	1.2 48	1 63	0.8 76	0.7 88		
470						2.4 15	2 22	1.8 27	1.6 32	1.2 50	1 64	0.8 78	0.7 90		
480						2.4 16	2 22	1.8 28	1.6 33	1.2 51	1 66	0.8 79	0.7 92		
490						2.4 16	2 23	1.8 29	1.6 34	1.2 52	1 67	0.8 81	0.7 94		
500						2.4 17	2 24	1.8 29	1.6 35	1.2 53	1 69	0.8 83	0.7 96		

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 11
60														0.7 11	0.6 14
70														0.7 14	0.6 17
80													0.8 11	0.7 16	0.6 20
90												0.9 10	0.8 14	0.6 19	0.6 23
100												0.9 12	0.8 16	0.6 21	0.6 26
110											1.1 10	0.9 14	0.8 18	0.6 24	0.6 29
120											1.1 11	0.9 16	0.8 20	0.6 26	0.6 32
130											1 13	0.9 18	0.8 22	0.6 29	0.6 35
140											1 15	0.9 20	0.8 24	0.6 31	0.5 37
150											1 16	0.9 21	0.8 26	0.6 34	0.5 40
160										1.3 11	1 18	0.9 23	0.8 28	0.6 36	0.5 43
170										1.3 12	1 19	0.9 25	0.8 30	0.6 39	0.5 46
180										1.3 14	1 21	0.9 27	0.8 32	0.6 41	0.5 49
190										1.3 15	1 22	0.9 29	0.8 34	0.6 43	0.5 52
200										1.3 16	1 24	0.8 30	0.7 36	0.6 46	0.5 55
210										1.2 18	1 25	0.8 32	0.7 38	0.6 48	0.5 58
220										1.2 19	1 27	0.8 34	0.7 40	0.6 51	0.5 60
230										1.2 20	1 28	0.8 36	0.7 42	0.6 53	0.5 63
240										1.2 21	1 30	0.8 37	0.7 44	0.6 56	0.5 66
250								1.8 10	1.2 23	1 31	0.8 39	0.7 46	0.6 58	0.5 69	
260								1.8 11	1.2 24	1 33	0.8 41	0.7 48	0.6 61	0.5 72	
270								1.7 12	1.2 25	1 34	0.8 43	0.7 50	0.6 63	0.5 75	
280								1.7 13	1.2 26	1 36	0.8 44	0.7 52	0.6 65	0.5 78	
290								1.7 14	1.2 27	1 37	0.8 46	0.7 54	0.6 68	0.5 80	
300							2 10	1.7 15	1.2 29	1 39	0.8 48	0.7 56	0.6 70	0.5 83	
310							1.9 11	1.7 16	1.2 30	1 40	0.8 49	0.7 58	0.6 73	0.5 86	
320							1.9 12	1.7 17	1.2 31	1 42	0.8 51	0.7 60	0.6 75	0.5 89	
330							1.9 13	1.7 18	1.2 32	1 43	0.8 53	0.7 62	0.6 78	0.5 92	
340							1.9 14	1.7 19	1.2 33	1 45	0.8 55	0.7 64	0.6 80	0.5 95	
350							1.9 15	1.7 20	1.2 35	1 46	0.8 56	0.7 66	0.6 83	0.5 98	
360						2.2 10	1.9 16	1.6 21	1.2 36	1 48	0.8 58	0.7 68	0.6 85	0.5 100	
370						2.2 10	1.9 17	1.6 22	1.2 37	1 49	0.8 60	0.7 70	0.6 87		
380						2.2 11	1.9 17	1.6 23	1.2 38	1 50	0.8 61	0.7 72	0.6 90		
390						2.2 12	1.8 18	1.6 23	1.2 39	1 52	0.8 63	0.7 74	0.6 92		
400						2.1 13	1.8 19	1.6 24	1.2 40	1 53	0.8 65	0.7 76	0.6 95		
410						2.1 14	1.8 20	1.6 25	1.2 41	1 55	0.8 67	0.7 77	0.6 97		
420						2.1 15	1.8 21	1.6 26	1.2 43	1 56	0.8 68	0.7 79	0.6 100		
430						2.1 15	1.8 22	1.6 27	1.2 44	1 58	0.8 70	0.7 81			
440						2.1 16	1.8 22	1.6 28	1.2 45	1 59	0.8 72	0.7 83			
450						2.1 17	1.8 23	1.6 29	1.2 46	1 61	0.8 73	0.7 85			
460						2.1 18	1.8 24	1.6 29	1.2 47	1 62	0.8 75	0.7 87			
470						2.5 10	2.1 18	1.8 25	1.6 30	1 64	0.8 77	0.7 89			
480						2.5 11	2.1 19	1.8 26	1.6 31	1 65	0.8 79	0.7 91			
490						2.5 12	2.1 20	1.8 26	1.6 32	1 66	0.8 80	0.7 93			
500						2.5 12	2.1 21	1.8 27	1.6 33	1 68	0.8 82	0.7 95			

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 4

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 10
60															0.6 12
70														0.8 10	0.6 14
80														0.8 11	0.6 16
90													0.9 10	0.8 13	0.6 18
100													0.9 11	0.8 15	0.6 20
110												1.1 10	0.9 12	0.7 17	0.6 22
120												1.1 11	0.9 14	0.7 18	0.6 24
130												1 12	0.9 15	0.7 20	0.6 26
140											1.3 10	1 14	0.9 17	0.7 22	0.6 28
150											1.2 11	1 15	0.9 18	0.7 24	0.6 30
160											1.2 12	1 16	0.9 19	0.7 25	0.6 32
170											1.2 13	1 17	0.9 21	0.7 27	0.6 34
180											1.2 14	1 18	0.9 22	0.7 29	0.6 36
190										1.6 10	1.2 15	1 20	0.9 23	0.7 30	0.6 38
200										1.5 11	1.2 16	1 21	0.9 25	0.7 32	0.6 40
210										1.5 12	1.2 17	1 22	0.9 26	0.7 34	0.6 42
220										1.5 12	1.2 18	1 23	0.9 27	0.7 35	0.6 44
230										1.5 13	1.2 19	1 24	0.9 29	0.7 37	0.6 46
240										1.5 14	1.2 20	1 25	0.9 30	0.7 39	0.6 48
250										1.5 15	1.2 21	1 27	0.9 32	0.7 41	0.6 50
260										1.5 16	1.2 22	1 28	0.9 33	0.7 42	0.6 52
270										1.5 16	1.2 23	1 29	0.9 34	0.7 44	0.6 54
280										1.5 17	1.2 24	1 30	0.9 36	0.7 46	0.6 56
290										1.5 18	1.2 25	1 31	0.9 37	0.7 47	0.6 58
300									2.1 10	1.5 19	1.2 26	1 32	0.9 38	0.7 49	0.6 60
310									2.1 10	1.5 20	1.2 27	1 34	0.9 40	0.7 51	0.6 62
320									2.1 11	1.5 20	1.2 28	1 35	0.9 41	0.7 52	0.6 64
330									2.1 11	1.5 21	1.2 29	1 36	0.9 42	0.7 54	0.6 66
340									2.1 12	1.5 22	1.2 30	1 37	0.9 44	0.7 56	0.6 69
350									2.1 13	1.5 23	1.2 31	1 38	0.9 45	0.7 58	0.6 70
360								2.4 10	2.1 13	1.5 23	1.2 32	1 39	0.9 46	0.7 59	0.6 72
370								2.4 10	2.1 14	1.5 24	1.2 33	1 41	0.9 48	0.7 61	0.6 74
380								2.4 11	2.1 14	1.5 25	1.2 34	1 42	0.9 49	0.7 63	0.6 76
390								2.4 11	2.1 15	1.5 26	1.2 35	1 43	0.9 51	0.7 64	0.6 78
400								2.4 12	2.1 15	1.5 26	1.2 36	1 44	0.9 52	0.7 66	0.6 80
410								2.3 12	2.1 16	1.5 27	1.2 37	1 45	0.9 53	0.7 68	0.6 82
420								2.3 13	2.1 16	1.5 28	1.2 38	1 46	0.9 55	0.7 69	0.6 84
430								2.3 13	2.1 17	1.5 29	1.2 39	1 48	0.9 56	0.7 71	0.6 86
440								2.7 10	2.3 14	1.5 30	1.2 40	1 49	0.9 57	0.7 73	0.6 89
450								2.7 10	2.3 14	1.5 30	1.2 41	1 50	0.9 59	0.7 74	0.6 91
460								2.7 11	2.3 15	1.5 31	1.2 42	1 51	0.9 60	0.7 76	0.6 93
470								2.7 11	2.3 15	1.5 32	1.2 43	1 52	0.9 61	0.7 78	0.6 95
480								2.7 12	2.3 16	1.5 33	1.2 44	1 53	0.9 63	0.7 79	0.6 97
490								2.7 12	2.3 16	1.4 33	1.2 45	1 55	0.9 64	0.7 81	0.6 99
500								2.7 13	2.3 17	1.4 34	1.2 45	1 56	0.9 65	0.7 83	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 6

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															0.6 10
60															0.6 12
70															0.6 14
80														0.8 11	0.6 16
90														0.8 12	0.6 18
100													1 10	0.8 14	0.6 20
110													0.9 11	0.8 16	0.6 22
120													0.9 13	0.7 18	0.6 24
130												1.1 11	0.9 14	0.7 19	0.6 26
140												1.1 12	0.9 15	0.7 21	0.6 28
150												1.1 13	0.9 17	0.7 23	0.6 30
160											1.3 10	1 15	0.9 18	0.7 25	0.6 32
170											1.3 11	1 16	0.9 20	0.7 26	0.6 34
180											1.2 12	1 17	0.9 21	0.7 28	0.6 36
190											1.2 14	1 18	0.9 23	0.7 30	0.6 38
200											1.2 15	1 20	0.9 24	0.7 31	0.6 40
210											1.2 16	1 21	0.9 25	0.7 33	0.6 42
220										1.6 10	1.2 17	1 22	0.9 27	0.7 35	0.6 44
230										1.6 11	1.2 18	1 23	0.9 28	0.7 37	0.6 46
240										1.6 12	1.2 19	1 24	0.9 29	0.7 38	0.6 48
250										1.5 13	1.2 20	1 26	0.9 31	0.7 40	0.6 50
260										1.5 14	1.2 21	1 27	0.9 32	0.7 42	0.6 52
270										1.5 14	1.2 22	1 28	0.9 33	0.7 43	0.6 54
280										1.5 15	1.2 23	1 29	0.9 35	0.7 45	0.6 56
290										1.5 16	1.2 24	1 30	0.9 36	0.7 47	0.6 58
300										1.5 17	1.2 25	1 32	0.9 38	0.7 48	0.6 60
310										1.5 18	1.2 26	1 33	0.9 39	0.7 50	0.6 62
320										1.5 19	1.2 27	1 34	0.9 40	0.7 52	0.6 64
330										1.5 19	1.2 28	1 35	0.9 42	0.7 54	0.6 66
340										1.5 20	1.2 29	1 36	0.9 43	0.7 55	0.6 68
350										1.5 21	1.2 30	1 37	0.9 44	0.7 57	0.6 70
360								2.2 10	1.5 22	1.2 31	1 39	0.9 46	0.7 59	0.6 72	
370								2.2 10	1.5 23	1.2 32	1 40	0.9 47	0.7 60	0.6 74	
380								2.1 11	1.5 23	1.2 33	1 41	0.9 48	0.7 62	0.6 76	
390								2.1 12	1.5 24	1.2 34	1 42	0.9 50	0.7 64	0.6 78	
400								2.1 12	1.5 25	1.2 35	1 43	0.9 51	0.7 65	0.6 80	
410								2.1 13	1.5 26	1.2 36	1 44	0.9 53	0.7 67	0.6 82	
420								2.1 13	1.5 26	1.2 37	1 46	0.9 54	0.7 69	0.6 84	
430								2.4 10	2.1 14	1.5 27	1 47	0.9 55	0.7 71	0.6 86	
440								2.4 10	2.1 15	1.5 28	1 48	0.9 57	0.7 72	0.6 88	
450								2.4 11	2.1 15	1.5 29	1 49	0.9 58	0.7 74	0.6 90	
460								2.4 11	2.1 16	1.5 30	1 50	0.9 59	0.7 76	0.6 92	
470								2.4 12	2.1 16	1.5 30	1 52	0.9 61	0.7 77	0.6 94	
480								2.4 12	2.1 17	1.5 31	1 53	0.9 62	0.7 79	0.6 96	
490								2.4 13	2.1 18	1.5 32	1 54	0.9 63	0.7 81	0.6 98	
500								2.3 13	2.1 18	1.4 33	1 55	0.9 65	0.7 82	0.6 100	

Input Parameters:

Channel Type = Trapezoidal

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Side Slope = 8

Q	S = 0.1% D(ft) B(ft)	S = 0.25% D(ft) B(ft)	S = 0.5% D(ft) B(ft)	S = 0.75% D(ft) B(ft)	S = 1% D(ft) B(ft)	S = 1.25% D(ft) B(ft)	S = 1.5% D(ft) B(ft)	S = 1.75% D(ft) B(ft)	S = 2% D(ft) B(ft)	S = 3% D(ft) B(ft)	S = 4% D(ft) B(ft)	S = 5% D(ft) B(ft)	S = 6% D(ft) B(ft)	S = 8% D(ft) B(ft)	S = 10% D(ft) B(ft)
10															
20															
30															
40															
50															
60															0.6 11
70															0.6 13
80														0.8 10	0.6 15
90														0.8 12	0.6 17
100														0.8 13	0.6 19
110														0.8 15	0.6 21
120													1 11	0.8 17	0.6 23
130													0.9 13	0.8 18	0.6 25
140												1.1 10	0.9 14	0.7 20	0.6 27
150												1.1 12	0.9 16	0.7 22	0.6 29
160												1.1 13	0.9 17	0.7 24	0.6 31
170												1.1 14	0.9 19	0.7 25	0.6 33
180											1.3 10	1 16	0.9 20	0.7 27	0.6 35
190											1.3 11	1 17	0.9 21	0.7 29	0.6 37
200											1.3 13	1 18	0.9 23	0.7 31	0.6 39
210											1.2 14	1 19	0.9 24	0.7 32	0.6 41
220											1.2 15	1 21	0.9 26	0.7 34	0.6 44
230											1.2 16	1 22	0.9 27	0.7 36	0.6 46
240											1.2 17	1 23	0.9 28	0.7 38	0.6 47
250										1.6 10	1.2 18	1 24	0.9 30	0.7 39	0.6 49
260										1.6 11	1.2 19	1 26	0.9 31	0.7 41	0.6 52
270										1.6 12	1.2 20	1 27	0.9 33	0.7 43	0.6 54
280										1.6 13	1.2 21	1 28	0.9 34	0.7 44	0.6 56
290										1.5 14	1.2 22	1 29	0.9 35	0.7 46	0.6 58
300										1.5 14	1.2 23	1 30	0.9 37	0.7 48	0.6 60
310										1.5 15	1.2 24	1 32	0.9 38	0.7 50	0.6 62
320										1.5 16	1.2 25	1 33	0.9 39	0.7 51	0.6 64
330										1.5 17	1.2 26	1 34	0.9 41	0.7 53	0.6 65
340										1.5 18	1.2 27	1 35	0.9 42	0.7 55	0.6 67
350										1.5 19	1.2 28	1 36	0.9 44	0.7 56	0.6 70
360										1.5 20	1.2 29	1 38	0.9 45	0.7 58	0.6 72
370										1.5 21	1.2 31	1 39	0.9 46	0.7 60	0.6 74
380										1.5 21	1.2 32	1 40	0.9 48	0.7 61	0.6 76
390										1.5 22	1.2 32	1 41	0.9 49	0.7 63	0.6 78
400										1.5 23	1.2 34	1 42	0.9 50	0.7 65	0.6 80
410										1.5 24	1.2 34	1 44	0.9 52	0.7 67	0.6 82
420										1.5 25	1.2 36	1 45	0.9 53	0.7 68	0.6 84
430									2.2 10	1.5 25	1.2 36	1 46	0.9 55	0.7 70	0.6 86
440									2.2 11	1.5 26	1.2 37	1 47	0.9 56	0.7 72	0.6 88
450									2.2 11	1.5 27	1.2 38	1 48	0.9 57	0.7 73	0.6 90
460									2.1 12	1.5 28	1.2 39	1 50	0.9 59	0.7 75	0.6 92
470									2.1 13	1.5 29	1.2 40	1 51	0.9 60	0.7 77	0.6 94
480									2.1 13	1.5 29	1.2 41	1 52	0.9 61	0.7 78	0.6 96
490									2.1 14	1.5 30	1.2 42	1 53	0.9 63	0.7 80	0.6 98
500									2.1 15	1.5 31	1.2 43	1 54	0.9 64	0.7 82	0.6 100

Appendix D

Design Tables for Parabolic Channels

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10					2	16	1.7	10	1.5	13	1.4	14	1.3	16	1.2	18	1.1	19	1	25	0.8	29	0.7	32	0.7	34	0.6	39	0.5	43
20							1.7	21	1.5	25	1.3	29	1.3	32	1.2	36	1.1	39	1	50	0.8	57	0.7	63	0.7	69	0.6	78	0.5	86
30			2.8	15	2	24	1.6	31	1.5	37	1.3	43	1.3	49	1.2	53	1.1	58	1	75	0.8	85	0.7	95	0.7	103				
40			2.8	20	2	32	1.6	41	1.5	50	1.3	58	1.3	65	1.2	71	1.1	78	1	100	0.8	114	0.7	126						
50			2.7	24	2	39	1.6	52	1.5	62	1.3	72	1.3	81	1.2	89	1.1	97	1	124	0.8	142								
60			2.7	29	1.9	47	1.6	62	1.5	75	1.3	86	1.3	97	1.2	107	1.1	116	1	149										
70			2.7	34	1.9	55	1.6	72	1.5	87	1.3	101	1.3	113	1.2	125	1.1	136	1	174										
80			2.7	39	1.9	63	1.6	83	1.5	100	1.3	115	1.3	129	1.2	143	1.1	155												
90			2.7	44	1.9	71	1.6	93	1.5	112	1.3	130	1.3	146	1.2	160	1.1	174												
100	4.5	25	2.7	49	1.9	79	1.6	103	1.5	125	1.3	144	1.3	162	1.2	178	1.1	194												
110	4.5	27	2.7	53	1.9	87	1.6	114	1.5	137	1.3	158	1.3	178	1.2	196	1.1	213												
120	4.4	30	2.7	58	1.9	95	1.6	124	1.5	150	1.3	173	1.3	194	1.2	214														
130	4.4	32	2.7	63	1.9	102	1.6	134	1.5	162	1.3	187	1.3	210	1.2	232														
140	4.4	34	2.7	68	1.9	110	1.6	145	1.5	175	1.3	202	1.3	227																
150	4.4	37	2.7	73	1.9	118	1.6	155	1.5	187	1.3	216	1.3	243																
160	4.4	39	2.7	78	1.9	126	1.6	165	1.5	199	1.3	230																		
170	4.4	42	2.7	82	1.9	134	1.6	176	1.5	212	1.3	245																		
180	4.3	44	2.7	87	1.9	142	1.6	186	1.5	224	1.3	259																		
190	4.3	46	2.7	92	1.9	150	1.6	196	1.5	237																				
200	4.3	49	2.7	97	1.9	157	1.6	207	1.5	249																				
210	4.3	51	2.7	102	1.9	165	1.6	217	1.5	262																				
220	4.3	54	2.7	107	1.9	173	1.6	227	1.5	274																				
230	4.3	56	2.7	112	1.9	181	1.6	238	1.5	287																				
240	4.3	59	2.7	116	1.9	189	1.6	248																						
250	4.3	61	2.7	121	1.9	197	1.6	258																						
260	4.3	63	2.7	126	1.9	205	1.6	269																						
270	4.3	66	2.7	131	1.9	213	1.6	279																						
280	4.3	68	2.7	136	1.9	220	1.6	289																						
290	4.3	71	2.7	141	1.9	228	1.6	300																						
300	4.3	73	2.7	146	1.9	236	1.6	310																						
310	4.3	76	2.7	150	1.9	244	1.6	320																						
320	4.3	78	2.7	155	1.9	252																								
330	4.3	80	2.7	160	1.9	260																								
340	4.3	83	2.7	165	1.9	268																								
350	4.3	85	2.7	170	1.9	276																								
360	4.3	88	2.7	175	1.9	283																								
370	4.3	90	2.7	180	1.9	291																								
380	4.3	93	2.7	184	1.9	299																								
390	4.3	95	2.7	189	1.9	307																								
400	4.3	98	2.7	194	1.9	315																								
410	4.3	100	2.7	199	1.9	323																								
420	4.3	102	2.7	204	1.9	331																								
430	4.3	105	2.7	209	1.9	339																								
440	4.3	107	2.7	213	1.9	346																								
450	4.3	110	2.7	218	1.9	354																								
460	4.3	112	2.7	223	1.9	362																								
470	4.3	115	2.7	228	1.9	370																								
480	4.3	117	2.7	233	1.9	378																								
490	4.3	119	2.7	238	1.9	386																								
500	4.3	122	2.7	243																										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.8	14	1.7	9	1.5	10	1.4	11	1.3	12	1.2	13	1	17	0.9	21	0.8	24	0.8	26	0.7	30	0.6	33
20							1.8	14	1.6	17	1.4	20	1.3	22	1.2	25	1.2	27	1	35	0.9	42	0.8	48	0.8	53	0.7	60	0.6	67
30					2.2	16	1.8	21	1.6	26	1.4	30	1.3	33	1.2	37	1.2	40	1	52	0.9	62	0.8	72	0.8	79	0.7	90	0.6	100
40					2.2	21	1.8	28	1.6	34	1.4	40	1.3	45	1.2	49	1.2	54	1	70	0.9	83	0.8	95	0.8	105	0.7	120		
50			3.2	16	2.1	26	1.8	35	1.6	43	1.4	49	1.3	56	1.2	62	1.2	67	1	87	0.9	104	0.8	119	0.8	131				
60			3.1	19	2.1	32	1.8	42	1.6	51	1.4	59	1.3	67	1.2	74	1.2	81	1	104	0.9	125	0.8	143						
70			3.1	22	2.1	37	1.8	49	1.6	60	1.4	69	1.3	78	1.2	86	1.2	94	1	122	0.9	146	0.8	167						
80			3.1	25	2.1	42	1.8	56	1.6	68	1.4	79	1.3	89	1.2	99	1.2	107	1	139	0.9	166								
90			3.1	29	2.1	47	1.8	63	1.6	76	1.4	89	1.3	100	1.2	111	1.2	121	1	156										
100			3	32	2.1	53	1.8	70	1.6	85	1.4	99	1.3	111	1.2	123	1.2	134	1	174										
110			3	35	2.1	58	1.8	77	1.6	94	1.4	109	1.3	123	1.2	136	1.2	148	1	191										
120			3	38	2.1	63	1.8	84	1.6	102	1.4	119	1.3	134	1.2	148	1.2	161												
130			3	41	2.1	68	1.8	91	1.6	111	1.4	128	1.3	145	1.2	160	1.2	175												
140			3	44	2.1	74	1.8	98	1.6	119	1.4	138	1.3	156	1.2	172	1.2	188												
150			3	48	2.1	79	1.8	105	1.6	128	1.4	148	1.3	167	1.2	185	1.2	202												
160			3	51	2.1	84	1.8	112	1.6	136	1.4	158	1.3	178	1.2	197	1.2	215												
170			3	54	2.1	89	1.8	119	1.6	145	1.4	168	1.3	189	1.2	209	1.2	228												
180	5.3	28	3	57	2.1	95	1.8	126	1.6	153	1.4	178	1.3	201	1.2	222														
190	5.3	29	3	60	2.1	100	1.8	133	1.6	162	1.4	188	1.3	212	1.2	234														
200	5.3	31	3	63	2.1	105	1.8	140	1.6	170	1.4	198	1.3	223	1.2	246														
210	5.3	32	3	66	2.1	110	1.8	147	1.6	179	1.4	208	1.3	234																
220	5.2	34	3	70	2.1	116	1.8	154	1.6	187	1.4	217	1.3	245																
230	5.2	35	3	73	2.1	121	1.8	161	1.6	196	1.4	227	1.3	256																
240	5.2	37	3	76	2.1	126	1.8	168	1.6	204	1.4	237																		
250	5.2	38	3	79	2.1	132	1.8	175	1.6	213	1.4	247																		
260	5.2	40	3	82	2.1	137	1.8	182	1.6	221	1.4	257																		
270	5.2	41	3	85	2.1	142	1.8	189	1.6	230	1.4	267																		
280	5.2	43	3	89	2.1	147	1.8	196	1.6	238	1.4	277																		
290	5.2	44	3	92	2.1	153	1.8	203	1.6	247																				
300	5.2	46	3	95	2.1	158	1.8	210	1.6	255																				
310	5.2	47	3	98	2.1	163	1.8	217	1.6	264																				
320	5.2	49	3	101	2.1	168	1.8	224	1.6	272																				
330	5.2	50	3	104	2.1	174	1.8	231	1.6	281																				
340	5.2	52	3	108	2.1	179	1.8	238	1.6	289																				
350	5.2	53	3	111	2.1	184	1.8	245	1.6	298																				
360	5.2	55	3	114	2.1	189	1.8	252	1.6	306																				
370	5.1	56	3	117	2.1	195	1.8	259																						
380	5.1	58	3	120	2.1	200	1.8	266																						
390	5.1	59	3	123	2.1	205	1.8	273																						
400	5.1	61	3	127	2.1	210	1.8	280																						
410	5.1	62	3	130	2.1	216	1.8	287																						
420	5.1	64	3	133	2.1	221	1.8	294																						
430	5.1	65	3	136	2.1	226	1.8	301																						
440	5.1	67	3	139	2.1	231	1.8	308																						
450	5.1	69	3	142	2.1	237	1.8	315																						
460	5.1	70	3	146	2.1	242	1.8	322																						
470	5.1	72	3	149	2.1	247	1.8	328																						
480	5.1	73	3	152	2.1	252	1.8	335																						
490	5.1	75	3	155	2.1	258	1.8	342																						
500	5.1	76	3	158	2.1	263	1.8	349																						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10						1.4	8 1.3	8 1.1	11 1	13 0.9	15 0.8	17 0.7	20 0.7	23	
20					1.8 10	1.6 12	1.5 14	1.4 15	1.3 17	1.1 22	1 26	0.9 30	0.8 34	0.7 41	0.7 47
30				2.1 13	1.8 15	1.6 18	1.5 20	1.4 23	1.3 25	1.1 33	1 39	0.9 45	0.8 51	0.7 61	0.7 70
40				2 17	1.8 21	1.6 24	1.4 27	1.3 30	1.3 33	1.1 44	1 52	0.9 61	0.8 68	0.7 81	0.7 93
50			2.6 16	2 21	1.7 26	1.6 30	1.4 34	1.3 38	1.3 41	1.1 54	1 66	0.9 76	0.8 85	0.7 102	0.7 117
60			2.5 19	2 25	1.7 31	1.6 36	1.4 41	1.3 45	1.3 50	1.1 65	1 79	0.9 91	0.8 102	0.7 122	
70			2.5 22	2 29	1.7 36	1.6 42	1.4 48	1.3 53	1.3 58	1.1 76	1 92	0.9 106	0.8 119	0.7 142	
80			2.5 25	2 33	1.7 41	1.6 48	1.4 55	1.3 61	1.3 66	1.1 87	1 105	0.9 121	0.8 136		
90			2.5 28	2 37	1.7 46	1.6 54	1.4 61	1.3 68	1.3 75	1.1 98	1 118	0.9 136	0.8 153		
100			2.5 31	2 42	1.7 51	1.6 60	1.4 68	1.3 76	1.3 83	1.1 109	1 131	0.9 151			
110		3.8 20	2.5 34	2 46	1.7 56	1.6 66	1.4 75	1.3 83	1.3 91	1.1 120	1 144	0.9 166			
120		3.8 22	2.5 37	2 50	1.7 62	1.6 72	1.4 82	1.3 91	1.3 99	1.1 131	1 157				
130		3.8 23	2.5 40	2 54	1.7 67	1.6 78	1.4 89	1.3 98	1.3 108	1.1 141	1 170				
140		3.8 25	2.5 43	2 58	1.7 72	1.6 84	1.4 95	1.3 106	1.3 116	1.1 152	1 183				
150		3.7 27	2.5 46	2 63	1.7 77	1.6 90	1.4 102	1.3 114	1.3 124	1.1 163					
160		3.7 29	2.5 49	2 67	1.7 82	1.6 96	1.4 109	1.3 121	1.3 133	1.1 174					
170		3.7 30	2.5 52	2 71	1.7 87	1.6 102	1.4 116	1.3 129	1.3 141	1.1 185					
180		3.7 32	2.5 55	2 75	1.7 92	1.6 108	1.4 123	1.3 136	1.3 149	1.1 196					
190		3.7 34	2.5 58	2 79	1.7 97	1.6 114	1.4 130	1.3 144	1.3 157	1.1 207					
200		3.7 36	2.5 62	2 83	1.7 102	1.6 120	1.4 136	1.3 151	1.3 166						
210		3.7 37	2.5 65	2 87	1.7 108	1.6 126	1.4 143	1.3 159	1.3 174						
220		3.7 39	2.5 68	2 92	1.7 113	1.6 132	1.4 150	1.3 167	1.3 182						
230		3.7 41	2.5 71	2 96	1.7 118	1.6 138	1.4 157	1.3 174	1.3 191						
240		3.7 43	2.5 74	2 100	1.7 123	1.6 144	1.4 164	1.3 182	1.3 199						
250		3.7 45	2.5 77	2 104	1.7 128	1.6 150	1.4 170	1.3 189	1.3 207						
260		3.7 46	2.5 80	2 108	1.7 133	1.6 156	1.4 177	1.3 197	1.3 216						
270		3.7 48	2.5 83	2 112	1.7 138	1.6 162	1.4 184	1.3 204	1.3 224						
280		3.7 50	2.5 86	2 117	1.7 143	1.6 168	1.4 191	1.3 212	1.3 232						
290		3.7 52	2.5 89	2 121	1.7 149	1.6 174	1.4 198	1.3 220	1.3 240						
300		3.7 53	2.5 92	2 125	1.7 154	1.6 180	1.4 205	1.3 227	1.3 249						
310		3.7 55	2.5 95	2 129	1.7 159	1.6 186	1.4 211	1.3 235							
320		3.7 57	2.5 98	2 133	1.7 164	1.6 192	1.4 218	1.3 242							
330		3.7 59	2.5 101	2 137	1.7 169	1.6 198	1.4 225	1.3 250							
340		3.7 61	2.5 105	2 142	1.7 174	1.6 204	1.4 232	1.3 257							
350		3.7 62	2.5 108	2 146	1.7 179	1.6 210	1.4 239	1.3 265							
360		3.7 64	2.5 111	2 150	1.7 184	1.6 216	1.4 245								
370		3.7 66	2.5 114	2 154	1.7 190	1.6 222	1.4 252								
380		3.7 68	2.5 117	2 158	1.7 195	1.6 228	1.4 259								
390		3.7 69	2.5 120	2 162	1.7 200	1.6 234	1.4 266								
400		3.7 71	2.5 123	2 167	1.7 205	1.6 240	1.4 273								
410		3.7 73	2.5 126	2 171	1.7 210	1.6 246	1.4 280								
420		3.7 75	2.5 129	2 175	1.7 215	1.6 252	1.4 286								
430	7 35	3.7 76	2.5 132	2 179	1.7 220	1.6 258									
440	7 36	3.7 78	2.5 135	2 183	1.7 225	1.6 264									
450	7 37	3.7 80	2.5 138	2 187	1.7 231	1.6 270									
460	7 37	3.7 82	2.5 141	2 192	1.7 236	1.6 276									
470	7 38	3.7 84	2.5 145	2 196	1.7 241	1.6 282									
480	6.9 39	3.7 85	2.5 148	2 200	1.7 246	1.6 288									
490	6.9 40	3.6 87	2.5 151	2 204	1.7 251	1.6 294									
500	6.9 40	3.6 89	2.5 154	2 208	1.7 256	1.6 300									

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10							1.6 10	1.5 11	1.4 12	1.2 8	1 10	0.9 11	0.9 13	0.8 15	0.7 17
20							1.6 19	1.5 22	1.4 24	1.1 16	1 19	0.9 22	0.9 25	0.8 30	0.7 35
30					2 11	1.8 13	1.6 15	1.5 16	1.4 18	1.1 24	1 29	0.9 33	0.9 37	0.8 45	0.7 52
40				2.3 12	2 15	1.7 17	1.6 19	1.5 22	1.4 24	1.1 32	1 38	0.9 44	0.9 50	0.8 60	0.7 69
50				2.3 15	1.9 18	1.7 21	1.6 24	1.5 27	1.4 30	1.1 39	1 48	0.9 55	0.9 62	0.8 75	0.7 87
60				2.3 18	1.9 22	1.7 26	1.6 29	1.4 33	1.4 36	1.1 47	1 57	0.9 67	0.9 75	0.8 90	0.7 104
70		2.9 15	2.3 20	1.9 25	1.7 30	1.6 34	1.4 38	1.4 42	1.1 55	1 67	0.9 78	0.9 87	0.8 105	0.7 121	
80		2.9 17	2.2 23	1.9 29	1.7 34	1.6 39	1.4 43	1.4 48	1.1 63	1 76	0.9 89	0.9 100	0.8 120	0.7 138	
90		2.9 19	2.2 26	1.9 33	1.7 38	1.6 44	1.4 49	1.4 54	1.1 71	1 86	0.9 100	0.9 112	0.8 135		
100		2.9 21	2.2 29	1.9 36	1.7 43	1.6 49	1.4 54	1.4 60	1.1 79	1 96	0.9 111	0.9 125	0.8 150		
110		2.8 23	2.2 32	1.9 40	1.7 47	1.6 53	1.4 60	1.4 66	1.1 87	1 105	0.9 122	0.9 137			
120		2.8 25	2.2 35	1.9 43	1.7 51	1.6 58	1.4 65	1.4 71	1.1 95	1 115	0.9 133	0.9 150			
130		2.8 28	2.2 38	1.9 47	1.7 55	1.6 63	1.4 70	1.4 77	1.1 102	1 124	0.9 144	0.9 162			
140		2.8 30	2.2 41	1.9 51	1.7 60	1.6 68	1.4 76	1.4 83	1.1 110	1 134	0.9 155				
150		2.8 32	2.2 44	1.9 54	1.7 64	1.6 73	1.4 81	1.4 89	1.1 118	1 143	0.9 166				
160		2.8 34	2.2 46	1.9 58	1.7 68	1.6 78	1.4 87	1.4 95	1.1 126	1 153	0.9 178				
170		2.8 36	2.2 49	1.9 61	1.7 72	1.6 83	1.4 92	1.4 101	1.1 134	1 163					
180		2.8 38	2.2 52	1.9 65	1.7 77	1.6 87	1.4 98	1.4 107	1.1 142	1 172					
190	4.5 23	2.8 40	2.2 55	1.9 69	1.7 81	1.6 92	1.4 103	1.4 113	1.1 150	1 182					
200	4.5 24	2.8 42	2.2 58	1.9 72	1.7 85	1.6 97	1.4 108	1.4 119	1.1 158	1 191					
210	4.4 25	2.8 44	2.2 61	1.9 76	1.7 89	1.6 102	1.4 114	1.4 125	1.1 165	1 201					
220	4.4 26	2.8 47	2.2 64	1.9 79	1.7 94	1.6 107	1.4 119	1.4 131	1.1 173						
230	4.4 28	2.8 49	2.2 67	1.9 83	1.7 98	1.6 112	1.4 125	1.4 137	1.1 181						
240	4.4 29	2.8 51	2.2 70	1.9 87	1.7 102	1.6 117	1.4 130	1.4 143	1.1 189						
250	4.4 30	2.8 53	2.2 73	1.9 90	1.7 106	1.6 121	1.4 135	1.4 149	1.1 197						
260	4.4 31	2.8 55	2.2 75	1.9 94	1.7 111	1.6 126	1.4 141	1.4 155	1.1 205						
270	4.4 32	2.8 57	2.2 78	1.9 98	1.7 115	1.6 131	1.4 146	1.4 161	1.1 213						
280	4.4 33	2.8 59	2.2 81	1.9 101	1.7 119	1.6 136	1.4 152	1.4 167	1.1 221						
290	4.4 34	2.8 61	2.2 84	1.9 105	1.7 123	1.6 141	1.4 157	1.4 173							
300	4.4 36	2.8 63	2.2 87	1.9 108	1.7 128	1.6 146	1.4 163	1.4 179							
310	4.4 37	2.8 65	2.2 90	1.9 112	1.7 132	1.6 151	1.4 168	1.4 185							
320	4.4 38	2.8 68	2.2 93	1.9 116	1.7 136	1.6 155	1.4 173	1.4 191							
330	4.4 39	2.8 70	2.2 96	1.9 119	1.7 140	1.6 160	1.4 179	1.4 197							
340	4.3 40	2.8 72	2.2 99	1.9 123	1.7 145	1.6 165	1.4 184	1.4 202							
350	4.3 41	2.8 74	2.2 102	1.9 126	1.7 149	1.6 170	1.4 190	1.4 208							
360	4.3 43	2.8 76	2.2 104	1.9 130	1.7 153	1.6 175	1.4 195	1.4 214							
370	4.3 44	2.8 78	2.2 107	1.9 134	1.7 157	1.6 180	1.4 201	1.4 220							
380	4.3 45	2.8 80	2.2 110	1.9 137	1.7 162	1.6 185	1.4 206	1.4 226							
390	4.3 46	2.8 82	2.2 113	1.9 141	1.7 166	1.6 189	1.4 211	1.4 232							
400	4.3 47	2.8 84	2.2 116	1.9 144	1.7 170	1.6 194	1.4 217	1.4 238							
410	4.3 48	2.8 87	2.2 119	1.9 148	1.7 174	1.6 199	1.4 222	1.4 244							
420	4.3 50	2.8 89	2.2 122	1.9 152	1.7 179	1.6 204	1.4 228	1.4 250							
430	4.3 51	2.8 91	2.2 125	1.9 155	1.7 183	1.6 209	1.4 233	1.4 256							
440	4.3 52	2.8 93	2.2 128	1.9 159	1.7 187	1.6 214	1.4 238	1.4 262							
450	4.3 53	2.8 95	2.2 131	1.9 162	1.7 191	1.6 218	1.4 244	1.4 268							
460	4.3 54	2.8 97	2.2 133	1.9 166	1.7 196	1.6 223	1.4 249								
470	4.3 56	2.8 99	2.2 136	1.9 170	1.7 200	1.6 228	1.4 255								
480	4.3 57	2.8 101	2.2 139	1.9 173	1.7 204	1.6 233	1.4 260								
490	4.3 58	2.8 103	2.2 142	1.9 177	1.7 208	1.6 238	1.4 266								
500	4.3 59	2.8 105	2.2 145	1.9 181	1.7 213	1.6 243	1.4 271								

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							2	11	1.7	13	1.5	15	1.5	9	1.3	9	1.3	10	1.1	13	0.9	16	0.9	19	0.8	21	0.7	25	0.6	28
20							1.9	16	1.7	19	1.5	22	1.4	17	1.3	19	1.2	21	1	27	0.9	32	0.9	37	0.8	41	0.7	50	0.6	55
30							1.9	21	1.7	26	1.5	30	1.4	25	1.3	28	1.2	31	1	40	0.9	48	0.9	56	0.8	62	0.7	74	0.6	83
40					2.4	16	1.9	21	1.7	26	1.5	30	1.4	34	1.3	38	1.2	41	1	54	0.9	64	0.9	74	0.8	83	0.7	99	0.6	110
50					2.3	20	1.9	26	1.7	32	1.5	37	1.4	42	1.3	47	1.2	51	1	67	0.9	80	0.9	93	0.8	104	0.7	124		
60					2.3	23	1.9	31	1.6	39	1.5	45	1.4	51	1.3	56	1.2	62	1	80	0.9	97	0.9	111	0.8	124				
70					2.3	27	1.9	37	1.6	45	1.5	52	1.4	59	1.3	66	1.2	72	1	94	0.9	113	0.9	130	0.8	145				
80			3.5	19	2.3	31	1.9	42	1.6	51	1.5	60	1.4	68	1.3	75	1.2	82	1	107	0.9	129	0.9	148						
90			3.5	21	2.3	35	1.9	47	1.6	58	1.5	67	1.4	76	1.3	85	1.2	92	1	120	0.9	145	0.9	167						
100			3.4	23	2.3	39	1.9	52	1.6	64	1.5	75	1.4	85	1.3	94	1.2	103	1	134	0.9	161								
110			3.4	25	2.3	43	1.9	58	1.6	71	1.5	82	1.4	93	1.3	103	1.2	113	1	147	0.9	177								
120			3.4	28	2.3	47	1.9	63	1.6	77	1.5	90	1.4	102	1.3	113	1.2	123	1	161										
130			3.4	30	2.3	51	1.9	68	1.6	83	1.5	97	1.4	110	1.3	122	1.2	134	1	174										
140			3.4	32	2.3	55	1.9	73	1.6	90	1.5	105	1.4	119	1.3	132	1.2	144	1	187										
150			3.4	35	2.3	59	1.9	79	1.6	96	1.5	112	1.4	127	1.3	141	1.2	154	1	201										
160			3.4	37	2.3	63	1.9	84	1.6	103	1.5	120	1.4	136	1.3	150	1.2	164												
170			3.4	39	2.3	66	1.9	89	1.6	109	1.5	127	1.4	144	1.3	160	1.2	175												
180			3.4	42	2.3	70	1.9	94	1.6	115	1.5	135	1.4	153	1.3	169	1.2	185												
190			3.4	44	2.3	74	1.9	100	1.6	122	1.5	142	1.4	161	1.3	179	1.2	195												
200			3.3	46	2.3	78	1.9	105	1.6	128	1.5	150	1.4	170	1.3	188	1.2	205												
210			3.3	48	2.3	82	1.9	110	1.6	135	1.5	157	1.4	178	1.3	197	1.2	216												
220			3.3	51	2.3	86	1.9	115	1.6	141	1.5	165	1.4	186	1.3	207	1.2	226												
230			3.3	53	2.3	90	1.9	121	1.6	147	1.5	172	1.4	195	1.3	216	1.2	236												
240			3.3	55	2.3	94	1.9	126	1.6	154	1.5	180	1.4	203	1.3	226														
250			3.3	58	2.3	98	1.9	131	1.6	160	1.5	187	1.4	212	1.3	235														
260			3.3	60	2.3	102	1.9	136	1.6	167	1.5	195	1.4	220	1.3	244														
270			3.3	62	2.3	105	1.9	141	1.6	173	1.5	202	1.4	229	1.3	254														
280			3.3	64	2.3	109	1.9	147	1.6	180	1.5	210	1.4	237																
290	6.2	32	3.3	67	2.3	113	1.9	152	1.6	186	1.5	217	1.4	246																
300	6.1	33	3.3	69	2.3	117	1.9	157	1.6	192	1.5	225	1.4	254																
310	6.1	34	3.3	71	2.3	121	1.9	162	1.6	199	1.5	232	1.4	263																
320	6.1	35	3.3	74	2.3	125	1.9	168	1.6	205	1.5	240	1.4	271																
330	6.1	36	3.3	76	2.3	129	1.9	173	1.6	212	1.5	247																		
340	6.1	37	3.3	78	2.3	133	1.9	178	1.6	218	1.5	255																		
350	6.1	38	3.3	81	2.3	137	1.9	183	1.6	224	1.5	262																		
360	6.1	39	3.3	83	2.3	141	1.9	189	1.6	231	1.5	270																		
370	6.1	40	3.3	85	2.3	144	1.9	194	1.6	237	1.5	277																		
380	6	41	3.3	87	2.3	148	1.9	199	1.6	244	1.5	285																		
390	6	42	3.3	90	2.3	152	1.9	204	1.6	250	1.5	292																		
400	6	43	3.3	92	2.3	156	1.9	210	1.6	256																				
410	6	44	3.3	94	2.3	160	1.9	215	1.6	263																				
420	6	45	3.3	97	2.3	164	1.9	220	1.6	269																				
430	6	46	3.3	99	2.3	168	1.9	225	1.6	276																				
440	6	47	3.3	101	2.3	172	1.9	230	1.6	282																				
450	6	48	3.3	103	2.3	176	1.9	236	1.6	288																				
460	6	49	3.3	106	2.3	180	1.9	241	1.6	295																				
470	6	50	3.3	108	2.3	183	1.9	246	1.6	301																				
480	6	51	3.3	110	2.3	187	1.9	251	1.6	308																				
490	6	52	3.3	113	2.3	191	1.9	257	1.6	314																				
500	6	54	3.3	115	2.3	195	1.9	262	1.6	321																				

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10						1.7 10	1.5 11	1.4 13	1.3 14	1.1 9	1 11	0.9 13	0.8 14	0.8 17	0.7 20
20						1.7 20	1.5 17	1.4 19	1.3 21	1.1 18	1 22	0.9 26	0.8 29	0.8 35	0.7 40
30					1.9 13	1.7 15	1.5 23	1.4 25	1.3 28	1.1 27	1 33	0.9 38	0.8 43	0.8 52	0.7 60
40				2.2 14	1.9 17	1.7 20	1.5 28	1.4 32	1.3 35	1.1 37	1 44	0.9 51	0.8 58	0.8 69	0.7 79
50				2.2 17	1.8 21	1.6 25	1.5 34	1.4 38	1.3 42	1.1 46	1 55	0.9 64	0.8 72	0.8 86	0.7 99
60			2.7 15	2.1 21	1.8 26	1.6 30	1.5 40	1.4 44	1.3 49	1.1 55	1 66	0.9 77	0.8 86	0.8 104	0.7 119
70			2.7 18	2.1 24	1.8 30	1.6 35	1.5 45	1.4 51	1.3 56	1.1 64	1 78	0.9 90	0.8 101	0.8 121	0.7 139
80			2.7 20	2.1 28	1.8 34	1.6 40	1.5 51	1.4 57	1.3 63	1.1 73	1 89	0.9 102	0.8 115	0.8 138	
90			2.7 23	2.1 31	1.8 38	1.6 45	1.5 57	1.4 63	1.3 69	1.1 82	1 100	0.9 115	0.8 130		
100			2.7 25	2.1 34	1.8 42	1.6 50	1.5 63	1.4 70	1.3 76	1.1 92	1 111	0.9 128	0.8 144		
110			2.7 28	2.1 38	1.8 47	1.6 55	1.5 68	1.4 76	1.3 83	1.1 101	1 122	0.9 141	0.8 158		
120			2.6 30	2.1 41	1.8 51	1.6 60	1.5 74	1.4 82	1.3 90	1.1 110	1 133	0.9 154			
130			2.6 33	2.1 45	1.8 55	1.6 65	1.5 80	1.4 89	1.3 97	1.1 119	1 144	0.9 166			
140			2.6 35	2.1 48	1.8 59	1.6 70	1.5 85	1.4 95	1.3 104	1.1 128	1 155	0.9 179			
150	4.1 22	2.6 38	2.1 51	1.8 64	1.6 75	1.5 91	1.4 101	1.3 111	1.1 146	1 166					
160	4.1 23	2.6 40	2.1 55	1.8 68	1.6 80	1.5 97	1.4 108	1.3 118	1.1 156	1 177					
170	4.1 25	2.6 43	2.1 58	1.8 72	1.6 85	1.5 102	1.4 114	1.3 125	1.1 165	1 188					
180	4.1 26	2.6 45	2.1 62	1.8 76	1.6 90	1.5 108	1.4 120	1.3 132	1.1 174						
190	4.1 27	2.6 48	2.1 65	1.8 81	1.6 95	1.5 114	1.4 127	1.3 139	1.1 183						
200	4.1 29	2.6 50	2.1 69	1.8 85	1.6 100	1.5 119	1.4 133	1.3 146	1.1 192						
210	4.1 30	2.6 53	2.1 72	1.8 89	1.6 105	1.5 125	1.4 139	1.3 153	1.1 201						
220	4 32	2.6 55	2.1 75	1.8 93	1.6 110	1.5 131	1.4 146	1.3 160	1.1 211						
230	4 33	2.6 58	2.1 79	1.8 98	1.6 115	1.5 136	1.4 152	1.3 167	1.1 220						
240	4 34	2.6 60	2.1 82	1.8 102	1.6 120	1.5 142	1.4 158	1.3 174							
250	4 36	2.6 63	2.1 86	1.8 106	1.6 125	1.5 148	1.4 165	1.3 181							
260	4 37	2.6 65	2.1 89	1.8 110	1.6 130	1.5 153	1.4 171	1.3 187							
270	4 39	2.6 68	2.1 93	1.8 115	1.6 135	1.5 159	1.4 177	1.3 194							
280	4 40	2.6 70	2.1 96	1.8 119	1.6 140	1.5 165	1.4 184	1.3 201							
290	4 42	2.6 73	2.1 99	1.8 123	1.6 145	1.5 170	1.4 190	1.3 208							
300	4 43	2.6 75	2.1 103	1.8 127	1.6 150	1.5 176	1.4 196	1.3 215							
310	4 44	2.6 78	2.1 106	1.8 132	1.6 155	1.5 182	1.4 202	1.3 222							
320	4 46	2.6 80	2.1 110	1.8 136	1.6 160	1.5 188	1.4 209	1.3 229							
330	4 47	2.6 83	2.1 113	1.8 140	1.6 165	1.5 193	1.4 215	1.3 236							
340	4 49	2.6 85	2.1 117	1.8 144	1.6 170	1.5 199	1.4 221	1.3 243							
350	4 50	2.6 88	2.1 120	1.8 148	1.6 175	1.5 205	1.4 228	1.3 250							
360	4 51	2.6 90	2.1 124	1.8 153	1.6 180	1.5 210	1.4 234	1.3 257							
370	4 53	2.6 93	2.1 127	1.8 157	1.6 185	1.5 216	1.4 240								
380	4 54	2.6 96	2.1 130	1.8 161	1.6 190	1.5 222	1.4 247								
390	4 56	2.6 98	2.1 134	1.8 165	1.6 195	1.5 227	1.4 253								
400	4 57	2.6 101	2.1 137	1.8 170	1.6 200	1.5 233	1.4 259								
410	4 59	2.6 103	2.1 141	1.8 174	1.6 205	1.5 239	1.4 266								
420	4 60	2.6 106	2.1 144	1.8 178	1.6 210	1.5 244	1.4 272								
430	4 62	2.6 108	2.1 148	1.8 182	1.6 215	1.5 250	1.4 278								
440	4 63	2.6 111	2.1 151	1.8 187	1.6 220	1.5 256									
450	4 64	2.6 113	2.1 154	1.8 191	1.6 225	1.5 261									
460	4 66	2.6 116	2.1 158	1.8 195	1.6 230	1.5 267									
470	4 67	2.6 118	2.1 161	1.8 199	1.6 235	1.5 273									
480	4 69	2.6 121	2.1 165	1.8 204	1.6 240	1.5 278									
490	4 70	2.6 123	2.1 168	1.8 208	1.6 245	1.5 284									
500	4 72	2.6 126	2.1 172	1.8 212	1.6 250										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10									1.6 8	1.3 11	1.1 7	1 8	0.9 9	0.8 11	0.7 13
20											1.1 14	1 16	0.9 18	0.8 22	0.7 25
30									1.5 12	1.2 17	1.1 20	1 24	0.9 27	0.8 32	0.7 38
40						2 12	1.8 13	1.6 15	1.5 17	1.2 22	1.1 27	1 32	0.9 36	0.8 43	0.7 50
50					2.3 12	2 15	1.8 17	1.6 19	1.5 21	1.2 28	1.1 34	1 39	0.9 45	0.8 54	0.7 63
60					2.2 15	1.9 18	1.7 20	1.6 23	1.5 25	1.2 33	1.1 41	1 47	0.9 54	0.8 65	0.7 75
70				2.7 14	2.2 17	1.9 20	1.7 23	1.6 26	1.5 29	1.2 39	1.1 47	1 55	0.9 62	0.8 76	0.7 88
80				2.6 16	2.2 20	1.9 23	1.7 27	1.6 30	1.5 33	1.2 44	1.1 54	1 63	0.9 71	0.8 86	0.7 100
90				2.6 18	2.2 22	1.9 26	1.7 30	1.6 34	1.5 37	1.2 50	1.1 61	1 71	0.9 80	0.8 97	0.7 113
100				2.6 20	2.2 24	1.9 29	1.7 33	1.6 37	1.5 41	1.2 55	1.1 68	1 79	0.9 89	0.8 108	0.7 125
110				2.6 21	2.2 27	1.9 32	1.7 37	1.6 41	1.5 46	1.2 61	1.1 75	1 87	0.9 98	0.8 119	0.7 138
120				2.6 23	2.2 29	1.9 35	1.7 40	1.6 45	1.5 50	1.2 66	1.1 81	1 95	0.9 107	0.8 130	
130			3.4 18	2.6 25	2.2 32	1.9 38	1.7 43	1.6 49	1.5 54	1.2 72	1.1 88	1 103	0.9 116	0.8 141	
140			3.4 20	2.6 27	2.2 34	1.9 41	1.7 47	1.6 52	1.5 58	1.2 78	1.1 95	1 110	0.9 125	0.8 151	
150			3.4 21	2.6 29	2.2 37	1.9 44	1.7 50	1.6 56	1.5 62	1.2 83	1.1 102	1 118	0.9 134		
160			3.4 22	2.6 31	2.2 39	1.9 47	1.7 53	1.6 60	1.5 66	1.2 89	1.1 108	1 126	0.9 143		
170			3.3 24	2.6 33	2.2 42	1.9 49	1.7 57	1.6 64	1.5 70	1.2 94	1.1 115	1 134	0.9 152		
180			3.3 25	2.6 35	2.2 44	1.9 52	1.7 60	1.6 68	1.5 74	1.2 100	1.1 122	1 142	0.9 161		
190			3.3 27	2.6 37	2.2 46	1.9 55	1.7 63	1.6 71	1.5 79	1.2 105	1.1 129	1 150	0.9 169		
200			3.3 28	2.6 39	2.2 49	1.9 58	1.7 67	1.6 75	1.5 83	1.2 111	1.1 135	1 158	0.9 178		
210			3.3 29	2.5 41	2.2 51	1.9 61	1.7 70	1.6 79	1.5 87	1.2 116	1.1 142	1 166			
220			3.3 31	2.5 43	2.2 54	1.9 64	1.7 73	1.6 82	1.5 91	1.2 122	1.1 149	1 173			
230			3.3 32	2.5 45	2.2 56	1.9 67	1.7 77	1.6 86	1.5 95	1.2 127	1.1 156	1 181			
240			3.3 33	2.5 47	2.2 59	1.9 70	1.7 80	1.6 90	1.5 99	1.2 133	1.1 163	1 189			
250			3.3 35	2.5 49	2.2 61	1.9 73	1.7 83	1.6 94	1.5 103	1.2 138	1.1 169				
260			3.3 36	2.5 50	2.2 63	1.9 76	1.7 87	1.6 97	1.5 108	1.2 144	1.1 176				
270			3.3 38	2.5 52	2.1 66	1.9 78	1.7 90	1.6 101	1.5 112	1.2 149	1.1 183				
280			3.3 39	2.5 54	2.1 68	1.9 81	1.7 93	1.6 105	1.5 116	1.2 155	1.1 190				
290			3.3 40	2.5 56	2.1 71	1.9 84	1.7 97	1.6 109	1.5 120	1.2 161	1.1 196				
300			3.3 42	2.5 58	2.1 73	1.9 87	1.7 100	1.6 112	1.5 124	1.2 166	1.1 203				
310			3.3 43	2.5 60	2.1 76	1.9 90	1.7 103	1.6 116	1.5 128	1.2 172	1.1 210				
320			3.3 44	2.5 62	2.1 78	1.9 93	1.7 107	1.6 120	1.5 132	1.2 177					
330			3.3 46	2.5 64	2.1 81	1.9 96	1.7 110	1.6 124	1.5 136	1.2 183					
340			3.3 47	2.5 66	2.1 83	1.9 99	1.7 113	1.6 127	1.5 141	1.2 188					
350			3.3 49	2.5 68	2.1 86	1.9 102	1.7 117	1.6 131	1.5 145	1.2 194					
360			3.3 50	2.5 70	2.1 88	1.9 105	1.7 120	1.6 135	1.5 149	1.2 199					
370		5.5 28	3.3 51	2.5 72	2.1 90	1.9 107	1.7 123	1.6 139	1.5 153	1.2 205					
380		5.5 29	3.3 53	2.5 74	2.1 93	1.9 110	1.7 127	1.6 142	1.5 157	1.2 210					
390		5.5 30	3.3 54	2.5 76	2.1 95	1.9 113	1.7 130	1.6 146	1.5 161	1.2 216					
400		5.5 30	3.3 55	2.5 78	2.1 98	1.9 116	1.7 134	1.6 150	1.5 165	1.2 221					
410		5.4 31	3.3 57	2.5 80	2.1 100	1.9 119	1.7 137	1.6 154	1.5 170	1.2 227					
420		5.4 32	3.3 58	2.5 82	2.1 103	1.9 122	1.7 140	1.6 157	1.5 174	1.2 232					
430		5.4 32	3.3 60	2.5 84	2.1 105	1.9 125	1.7 144	1.6 161	1.5 178	1.2 238					
440		5.4 33	3.3 61	2.5 85	2.1 107	1.9 128	1.7 147	1.6 165	1.5 182	1.2 244					
450		5.4 34	3.3 62	2.5 87	2.1 110	1.9 131	1.7 150	1.6 169	1.5 186						
460		5.4 35	3.3 64	2.5 89	2.1 112	1.9 134	1.7 154	1.6 172	1.5 190						
470		5.4 35	3.3 65	2.5 91	2.1 115	1.9 137	1.7 157	1.6 176	1.5 194						
480		5.4 36	3.3 66	2.5 93	2.1 117	1.9 139	1.7 160	1.6 180	1.5 198						
490		5.4 37	3.3 68	2.5 95	2.1 120	1.9 142	1.7 164	1.6 184	1.5 203						
500		5.4 37	3.3 69	2.5 97	2.1 122	1.9 145	1.7 167	1.6 187	1.5 207						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10										1.4 8	1.2 10	1.1 6	1 6	0.9 8	0.8 9
20										1.4 12	1.2 15	1.1 11	1 13	0.9 16	0.8 18
30										1.4 16	1.2 19	1.1 17	1 19	0.8 24	0.8 27
40								1.9 11	1.7 12	1.3 20	1.2 24	1 23	1 26	0.8 31	0.8 36
50							2 12	1.8 13	1.7 14	1.3 23	1.2 29	1 28	1 32	0.8 39	0.8 46
60						2.3 12	2 14	1.8 16	1.7 17	1.3 27	1.2 34	1 40	1 45	0.8 55	0.8 64
70						2.2 14	2 16	1.8 18	1.7 20	1.3 31	1.2 39	1 45	1 51	0.8 63	0.8 73
80					2.6 13	2.2 16	2 19	1.8 21	1.7 23	1.3 35	1.2 43	1 51	1 58	0.8 70	0.8 82
90					2.6 15	2.2 18	2 21	1.8 23	1.7 26	1.3 39	1.2 48	1 57	1 64	0.8 78	0.8 91
100					2.5 17	2.2 20	2 23	1.8 26	1.7 29	1.3 43	1.2 53	1 62	1 71	0.8 86	0.8 100
110					2.5 18	2.2 22	2 25	1.8 29	1.7 32	1.3 47	1.2 58	1 68	1 77	0.8 94	0.8 109
120				3.1 16	2.5 20	2.2 24	2 28	1.8 31	1.7 35	1.3 51	1.2 63	1 74	1 84	0.8 102	0.8 119
130				3.1 17	2.5 22	2.2 26	2 30	1.8 34	1.7 37	1.3 55	1.2 68	1 79	1 90	0.8 110	0.8 128
140				3.1 18	2.5 23	2.2 28	1.9 32	1.8 36	1.7 40	1.3 59	1.2 72	1 85	1 96	0.8 118	0.8 137
150				3.1 20	2.5 25	2.2 30	1.9 35	1.8 39	1.7 43	1.3 63	1.2 77	1 91	1 103	0.8 125	0.8 146
160				3 21	2.5 27	2.2 32	1.9 37	1.8 42	1.7 46	1.3 66	1.2 82	1 96	1 109	0.8 133	
170				3 22	2.5 28	2.2 34	1.9 39	1.8 44	1.7 49	1.3 70	1.2 87	1 102	1 116	0.8 141	
180				3 24	2.5 30	2.2 36	1.9 41	1.8 47	1.7 52	1.3 74	1.2 92	1 107	1 122	0.8 149	
190				3 25	2.5 32	2.2 38	1.9 44	1.8 49	1.7 55	1.3 78	1.2 97	1 113	1 128	0.8 157	
200				3 26	2.5 33	2.2 40	1.9 46	1.8 52	1.7 58	1.3 82	1.2 101	1 119	1 135	0.8 165	
210				3 27	2.5 35	2.2 42	1.9 48	1.8 55	1.7 60	1.3 86	1.2 106	1 124	1 141		
220				3 29	2.5 37	2.2 44	1.9 51	1.8 57	1.7 63	1.3 90	1.2 111	1 130	1 148		
230			4.1 21	3 30	2.5 38	2.2 46	1.9 53	1.8 60	1.7 66	1.3 94	1.2 116	1 136	1 154		
240			4.1 22	3 31	2.5 40	2.2 48	1.9 55	1.8 62	1.7 69	1.3 98	1.2 121	1 141	1 161		
250			4 23	3 33	2.5 41	2.2 50	1.9 58	1.8 65	1.7 72	1.3 102	1.2 126	1 147	1 167		
260			4 24	3 34	2.5 43	2.2 52	1.9 60	1.8 68	1.7 75	1.3 106	1.2 130	1 153	1 173		
270			4 25	3 35	2.5 45	2.2 54	1.9 62	1.8 70	1.7 78	1.3 110	1.2 135	1 158	1 180		
280			4 26	3 36	2.5 46	2.2 56	1.9 64	1.8 73	1.7 81	1.3 113	1.2 140	1 164	1 186		
290			4 27	3 38	2.5 48	2.2 58	1.9 67	1.8 75	1.7 84	1.3 117	1.2 145	1 170			
300			4 27	3 39	2.5 50	2.2 60	1.9 69	1.8 78	1.7 86	1.3 121	1.2 150	1 175			
310			4 28	3 40	2.5 51	2.2 62	1.9 71	1.8 81	1.7 89	1.3 125	1.2 155	1 181			
320			4 29	3 42	2.5 53	2.2 64	1.9 74	1.8 83	1.7 92	1.3 129	1.2 159	1 187			
330			4 30	3 43	2.5 55	2.2 66	1.9 76	1.8 86	1.7 95	1.3 133	1.2 164	1 192			
340			4 31	3 44	2.5 56	2.2 68	1.9 78	1.8 88	1.7 98	1.3 137	1.2 169	1 198			
350			4 32	3 45	2.5 58	2.2 70	1.9 81	1.8 91	1.7 101	1.3 141	1.2 174	1 204			
360			4 33	3 47	2.5 60	2.2 72	1.9 83	1.8 94	1.7 104	1.3 145	1.2 179				
370			4 34	3 48	2.5 61	2.2 74	1.9 85	1.8 96	1.7 107	1.3 149	1.2 183				
380			4 35	3 49	2.5 63	2.2 76	1.9 87	1.8 99	1.7 109	1.3 153	1.2 188				
390			4 35	3 51	2.5 65	2.2 78	1.9 90	1.8 101	1.7 112	1.3 156	1.2 193				
400			4 36	3 52	2.5 66	2.2 80	1.9 92	1.8 104	1.7 115	1.3 160	1.2 198				
410			4 37	3 53	2.5 68	2.2 82	1.9 94	1.8 107	1.7 118	1.3 164	1.2 203				
420			4 38	3 54	2.5 70	2.2 84	1.9 97	1.8 109	1.7 121	1.3 168	1.2 208				
430			4 39	3 56	2.5 71	2.2 86	1.9 99	1.8 112	1.7 124	1.3 172	1.2 212				
440			4 40	3 57	2.5 73	2.2 88	1.9 101	1.8 114	1.7 127	1.3 176	1.2 217				
450			4 41	3 58	2.5 75	2.2 89	1.9 104	1.8 117	1.7 130	1.3 180	1.2 222				
460			4 42	3 60	2.5 76	2.2 91	1.9 106	1.8 120	1.7 132	1.3 184	1.2 227				
470			4 43	3 61	2.5 78	2.2 93	1.9 108	1.8 122	1.7 135	1.3 188	1.2 232				
480			4 43	3 62	2.5 79	2.2 95	1.9 110	1.8 125	1.7 138						
490			4 44	3 64	2.5 81	2.2 97	1.9 113	1.8 127	1.7 141						
500			4 45	3 65	2.5 83	2.2 99	1.9 115	1.8 130	1.7 144						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10							1.7 9	1.5 10	1.4 11	1.2 7	1.1 9	0.9 10	0.9 11	0.8 14	0.7 16
20							1.6 13	1.5 15	1.4 16	1.2 14	1 18	0.9 20	0.9 23	0.8 28	0.7 32
30						1.8 12	1.6 18	1.5 20	1.4 22	1.2 22	1 26	0.9 30	0.9 34	0.8 41	0.7 48
40					2 13	1.8 15	1.6 22	1.5 25	1.4 27	1.2 29	1 35	0.9 41	0.9 46	0.8 55	0.7 64
50				2.4 13	2 16	1.8 19	1.6 31	1.5 35	1.4 38	1.2 36	1 44	0.9 51	0.9 57	0.8 69	0.7 79
60				2.4 16	2 20	1.8 23	1.6 40	1.5 44	1.4 49	1.2 43	1 52	0.9 61	0.9 69	0.8 83	0.7 95
70				2.3 18	2 23	1.8 27	1.6 57	1.5 64	1.4 70	1.2 50	1 61	0.9 71	0.9 80	0.8 96	0.7 111
80			3 15	2.3 21	2 26	1.8 31	1.6 35	1.5 39	1.4 43	1.2 57	1 70	0.9 81	0.9 92	0.8 110	0.7 127
90			3 17	2.3 24	2 29	1.8 35	1.6 40	1.5 44	1.4 49	1.2 65	1 79	0.9 91	0.9 103	0.8 124	
100			3 19	2.3 26	2 33	1.8 39	1.6 44	1.5 49	1.4 54	1.2 72	1 87	0.9 101	0.9 115	0.8 138	
110			3 21	2.3 29	2 36	1.7 42	1.6 48	1.5 54	1.4 60	1.2 79	1 96	0.9 112	0.9 126	0.8 152	
120			3 23	2.3 31	2 39	1.7 46	1.6 53	1.5 59	1.4 65	1.2 86	1 105	0.9 122	0.9 137		
130			2.9 25	2.3 34	2 42	1.7 50	1.6 57	1.5 64	1.4 70	1.2 93	1 114	0.9 132	0.9 149		
140			2.9 27	2.3 37	2 46	1.7 54	1.6 62	1.5 69	1.4 76	1.2 101	1 122	0.9 142	0.9 160		
150			2.9 29	2.3 39	2 49	1.7 58	1.6 66	1.5 74	1.4 81	1.2 108	1 131	0.9 152	0.9 172		
160			2.9 30	2.3 42	2 52	1.7 62	1.6 70	1.5 79	1.4 87	1.2 115	1 140	0.9 162			
170			2.9 32	2.3 44	2 56	1.7 66	1.6 75	1.5 84	1.4 92	1.2 122	1 149	0.9 172			
180			2.9 34	2.3 47	2 59	1.7 69	1.6 79	1.5 89	1.4 97	1.2 129	1 157	0.9 183			
190			2.9 36	2.3 50	2 62	1.7 73	1.6 84	1.5 94	1.4 103	1.2 136	1 166				
200			2.9 38	2.3 52	2 65	1.7 77	1.6 88	1.5 98	1.4 108	1.2 144	1 175				
210			2.9 40	2.3 55	2 69	1.7 81	1.6 92	1.5 103	1.4 114	1.2 151	1 184				
220			2.9 42	2.3 58	2 72	1.7 85	1.6 97	1.5 108	1.4 119	1.2 158	1 192				
230	4.7 25	2.9 44	2.3 60	2 75	1.7 89	1.6 101	1.5 113	1.4 125	1.2 165	1 201					
240	4.7 26	2.9 45	2.3 63	2 78	1.7 93	1.6 106	1.5 118	1.4 130	1.2 172						
250	4.7 27	2.9 47	2.3 65	2 82	1.7 96	1.6 110	1.5 123	1.4 135	1.2 180						
260	4.7 28	2.9 49	2.3 68	2 85	1.7 100	1.6 114	1.5 128	1.4 141	1.2 187						
270	4.6 29	2.9 51	2.3 71	2 88	1.7 104	1.6 119	1.5 133	1.4 146	1.2 194						
280	4.6 30	2.9 53	2.3 73	2 91	1.7 108	1.6 123	1.5 138	1.4 152	1.2 201						
290	4.6 31	2.9 55	2.3 76	2 95	1.7 112	1.6 128	1.5 143	1.4 157	1.2 208						
300	4.6 32	2.9 57	2.3 78	2 98	1.7 116	1.6 132	1.5 148	1.4 162	1.2 215						
310	4.6 33	2.9 59	2.3 81	2 101	1.7 119	1.6 136	1.5 153	1.4 168	1.2 223						
320	4.6 34	2.9 61	2.3 84	2 104	1.7 123	1.6 141	1.5 158	1.4 173	1.2 230						
330	4.6 35	2.9 62	2.3 86	2 108	1.7 127	1.6 145	1.5 162	1.4 179							
340	4.6 36	2.9 64	2.3 89	2 111	1.7 131	1.6 150	1.5 167	1.4 184							
350	4.6 37	2.9 66	2.3 91	2 114	1.7 135	1.6 154	1.5 172	1.4 190							
360	4.6 38	2.9 68	2.3 94	2 118	1.7 139	1.6 158	1.5 177	1.4 195							
370	4.6 39	2.9 70	2.3 97	2 121	1.7 143	1.6 163	1.5 182	1.4 200							
380	4.6 40	2.9 72	2.3 99	2 124	1.7 146	1.6 167	1.5 187	1.4 206							
390	4.6 41	2.9 74	2.3 102	2 127	1.7 150	1.6 172	1.5 192	1.4 211							
400	4.6 42	2.9 76	2.3 105	2 131	1.7 154	1.6 176	1.5 197	1.4 217							
410	4.6 43	2.9 78	2.3 107	2 134	1.7 158	1.6 181	1.5 202	1.4 222							
420	4.6 44	2.9 79	2.3 110	2 137	1.7 162	1.6 185	1.5 207	1.4 227							
430	4.6 45	2.9 81	2.3 112	2 140	1.7 166	1.6 189	1.5 212	1.4 233							
440	4.6 46	2.9 83	2.3 115	2 144	1.7 170	1.6 194	1.5 217	1.4 238							
450	4.6 47	2.9 85	2.3 118	2 147	1.7 173	1.6 198	1.5 221	1.4 244							
460	4.6 48	2.9 87	2.3 120	2 150	1.7 177	1.6 203	1.5 226	1.4 249							
470	4.6 49	2.9 89	2.3 123	2 153	1.7 181	1.6 207	1.5 231	1.4 254							
480	4.6 50	2.9 91	2.3 125	2 157	1.7 185	1.6 211	1.5 236	1.4 260							
490	4.6 51	2.9 93	2.3 128	2 160	1.7 189	1.6 216	1.5 241	1.4 265							
500	4.6 52	2.9 95	2.3 131	2 163	1.7 193	1.6 220	1.5 246	1.4 271							

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10										1.3 10	1.2 6	1 7	1 8	0.8 9	0.8 11
20										1.3 14	1.1 12	1 14	0.9 16	0.8 19	0.7 22
30								1.7 10	1.6 11	1.3 14	1.1 18	1 21	0.9 23	0.8 28	0.7 33
40							1.9 12	1.7 13	1.6 14	1.3 19	1.1 23	1 27	0.9 31	0.8 38	0.7 44
50						2.1 13	1.9 14	1.7 16	1.6 18	1.3 24	1.1 29	1 34	0.9 39	0.8 47	0.7 55
60					2.4 13	2.1 15	1.8 17	1.7 19	1.6 21	1.3 29	1.1 35	1 41	0.9 47	0.8 57	0.7 66
70					2.4 15	2 17	1.8 20	1.7 23	1.6 25	1.3 34	1.1 41	1 48	0.9 54	0.8 66	0.7 77
80					2.3 17	2 20	1.8 23	1.7 26	1.6 28	1.3 38	1.1 47	1 55	0.9 62	0.8 75	0.7 87
90				2.8 15	2.3 19	2 22	1.8 26	1.7 29	1.6 32	1.3 43	1.1 53	1 62	0.9 70	0.8 85	0.7 98
100				2.8 17	2.3 21	2 25	1.8 29	1.7 32	1.6 36	1.3 48	1.1 59	1 69	0.9 78	0.8 94	0.7 109
110				2.8 18	2.3 23	2 27	1.8 31	1.7 35	1.6 39	1.3 53	1.1 65	1 75	0.9 86	0.8 104	0.7 120
120				2.8 20	2.3 25	2 30	1.8 34	1.7 39	1.6 43	1.3 57	1.1 70	1 82	0.9 93	0.8 113	0.7 131
130				2.8 21	2.3 27	2 32	1.8 37	1.7 42	1.6 46	1.3 62	1.1 76	1 89	0.9 101	0.8 123	0.7 142
140				2.8 23	2.3 29	2 35	1.8 40	1.7 45	1.6 50	1.3 67	1.1 82	1 96	0.9 109	0.8 132	
150				2.7 25	2.3 31	2 37	1.8 43	1.7 48	1.6 53	1.3 72	1.1 88	1 103	0.9 117	0.8 142	
160		3.7 19	2.7 26	2.3 33	2 40	1.8 46	1.7 51	1.6 57	1.3 77	1.1 94	1 110	0.9 124	0.8 151		
170		3.6 20	2.7 28	2.3 35	2 42	1.8 49	1.7 55	1.6 60	1.3 81	1.1 100	1 117	0.9 132	0.8 160		
180		3.6 21	2.7 30	2.3 37	2 45	1.8 51	1.7 58	1.6 64	1.3 86	1.1 106	1 123	0.9 140			
190		3.6 22	2.7 31	2.3 40	2 47	1.8 54	1.7 61	1.6 67	1.3 91	1.1 112	1 130	0.9 148			
200		3.6 23	2.7 33	2.3 42	2 50	1.8 57	1.7 64	1.6 71	1.3 96	1.1 117	1 137	0.9 155			
210		3.6 25	2.7 35	2.3 44	2 52	1.8 60	1.7 67	1.6 75	1.3 101	1.1 123	1 144	0.9 163			
220		3.6 26	2.7 36	2.3 46	2 55	1.8 63	1.7 71	1.6 78	1.3 105	1.1 129	1 151	0.9 171			
230		3.6 27	2.7 38	2.3 48	2 57	1.8 66	1.7 74	1.6 82	1.3 110	1.1 135	1 158	0.9 179			
240		3.6 28	2.7 39	2.3 50	2 60	1.8 69	1.7 77	1.6 85	1.3 115	1.1 141	1 164				
250		3.6 29	2.7 41	2.3 52	2 62	1.8 71	1.7 80	1.6 89	1.3 120	1.1 147	1 171				
260		3.6 30	2.7 43	2.3 54	2 65	1.8 74	1.7 84	1.6 92	1.3 124	1.1 153	1 178				
270		3.6 31	2.7 44	2.3 56	2 67	1.8 77	1.7 87	1.6 96	1.3 129	1.1 159	1 185				
280		3.6 33	2.7 46	2.3 58	2 69	1.8 80	1.7 90	1.6 99	1.3 134	1.1 164	1 192				
290		3.6 34	2.7 48	2.3 60	2 72	1.8 83	1.7 93	1.6 103	1.3 139	1.1 170	1 199				
300		3.6 35	2.7 49	2.3 62	2 74	1.8 86	1.7 96	1.6 107	1.3 144	1.1 176					
310		3.6 36	2.7 51	2.3 64	2 77	1.8 89	1.7 100	1.6 110	1.3 148	1.1 182					
320		3.5 37	2.7 53	2.3 66	2 79	1.8 91	1.7 103	1.6 114	1.3 153	1.1 188					
330		3.5 38	2.7 54	2.3 69	2 82	1.8 94	1.7 106	1.6 117	1.3 158	1.1 194					
340		3.5 39	2.7 56	2.3 71	2 84	1.8 97	1.7 109	1.6 121	1.3 163	1.1 200					
350		3.5 41	2.7 57	2.3 73	2 87	1.8 100	1.7 112	1.6 124	1.3 167	1.1 206					
360		3.5 42	2.7 59	2.3 75	2 89	1.8 103	1.7 116	1.6 128	1.3 172	1.1 211					
370		3.5 43	2.7 61	2.3 77	2 92	1.8 106	1.7 119	1.6 131	1.3 177	1.1 217					
380		3.5 44	2.7 62	2.3 79	2 94	1.8 109	1.7 122	1.6 135	1.3 182						
390		3.5 45	2.7 64	2.3 81	2 97	1.8 111	1.7 125	1.6 138	1.3 187						
400		3.5 46	2.7 66	2.3 83	2 99	1.8 114	1.7 128	1.6 142	1.3 191						
410		3.5 48	2.7 67	2.3 85	2 102	1.8 117	1.7 132	1.6 146	1.3 196						
420		3.5 49	2.7 69	2.3 87	2 104	1.8 120	1.7 135	1.6 149	1.3 201						
430		3.5 50	2.7 71	2.3 89	2 107	1.8 123	1.7 138	1.6 153	1.3 206						
440		3.5 51	2.7 72	2.3 91	2 109	1.8 126	1.7 141	1.6 156	1.3 211						
450		3.5 52	2.7 74	2.3 93	2 112	1.8 129	1.7 145	1.6 160	1.3 215						
460		3.5 53	2.7 75	2.3 95	2 114	1.8 131	1.7 148	1.6 163	1.3 220						
470		3.5 54	2.7 77	2.3 98	2 117	1.8 134	1.7 151	1.6 167	1.3 225						
480		3.5 56	2.7 79	2.3 100	2 119	1.8 137	1.7 154	1.6 170	1.3 230						
490	6 31	3.5 57	2.7 80	2.3 102	2 122	1.8 140	1.7 157	1.6 174	1.3 234						
500	6 31	3.5 58	2.7 82	2.3 104	2 124	1.8 143	1.7 161	1.6 178	1.3 239						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10											1.3 7	1.2 8	1.1 9	0.9 6	0.8 7
20											1.3 10	1.2 12	1 14	0.9 11	0.8 13
30										1.6 8	1.3 14	1.1 16	1 19	0.9 17	0.8 20
40										1.5 11	1.3 17	1.1 20	1 23	0.9 23	0.8 27
50									2 10	1.5 14	1.3 21	1.1 25	1 28	0.9 29	0.8 33
60								2.1 11	1.9 12	1.5 17	1.3 24	1.1 29	1 33	0.9 34	0.8 40
70								2.1 13	1.9 14	1.5 20	1.3 28	1.1 33	1 37	0.9 46	0.8 54
80							2.3 13	2.1 15	1.9 16	1.5 22	1.3 31	1.1 37	1 42	0.9 51	0.8 60
90							2.3 15	2.1 16	1.9 18	1.5 25	1.3 34	1.1 41	1 47	0.9 57	0.8 67
100						2.6 14	2.3 16	2.1 18	1.9 20	1.5 28	1.3 35	1.1 45	1 51	0.9 63	0.8 74
110						2.6 15	2.3 18	2 20	1.9 22	1.5 31	1.3 38	1.1 49	1 56	0.9 69	0.8 80
120						2.6 17	2.3 19	2 22	1.9 24	1.5 33	1.3 42	1.1 53	1 61	0.9 74	0.8 87
130						2.6 18	2.3 21	2 24	1.9 26	1.5 36	1.3 45	1.1 57	1 65	0.9 80	0.8 94
140					3 16	2.5 19	2.3 22	2 25	1.9 28	1.5 39	1.3 48	1.1 61	1 70	0.9 86	0.8 100
150					3 17	2.5 21	2.2 24	2 27	1.9 30	1.5 42	1.3 52	1.1 69	1 79	0.9 97	0.8 114
160					3 18	2.5 22	2.2 26	2 29	1.9 32	1.5 44	1.3 55	1.1 73	1 84	0.9 103	0.8 120
170					3 19	2.5 23	2.2 27	2 31	1.9 34	1.5 47	1.3 59	1.1 86	1 89	0.9 109	0.8 127
180					3 20	2.5 25	2.2 29	2 33	1.9 36	1.5 50	1.3 62	1.1 93	1 98	0.9 114	0.8 134
190					3 22	2.5 26	2.2 30	2 34	1.9 38	1.5 53	1.3 66	1.1 102	1 102	0.9 126	0.8 147
200					2.9 23	2.5 27	2.2 32	2 36	1.9 40	1.5 55	1.3 69	1.1 106	1 107	0.9 132	0.8 154
210				3.7 19	2.9 24	2.5 29	2.2 33	2 38	1.9 42	1.5 58	1.3 73	1.1 110	1 112	0.9 137	0.8 160
220				3.7 19	2.9 25	2.5 30	2.2 35	2 40	1.9 44	1.5 61	1.3 76	1.1 114	1 130	0.9 160	
230				3.7 20	2.9 26	2.5 31	2.2 37	2 42	1.9 46	1.5 64	1.3 80	1.1 118	1 135	0.9 166	
240				3.6 21	2.9 27	2.5 33	2.2 38	2 43	1.9 48	1.5 67	1.3 83	1.1 122	1 140	0.9 172	
250				3.6 22	2.9 28	2.5 34	2.2 40	2 45	1.9 50	1.5 69	1.3 86	1.1 126	1 144	0.9 177	
260				3.6 23	2.9 29	2.5 36	2.2 41	2 47	1.9 52	1.5 72	1.3 90	1.1 139	1 158		
270				3.6 24	2.9 30	2.5 37	2.2 43	2 49	1.9 54	1.5 75	1.3 93	1.1 143	1 163		
280				3.6 24	2.9 32	2.5 38	2.2 45	2 51	1.9 56	1.5 78	1.3 97	1.1 147	1 168		
290				3.6 25	2.9 33	2.5 40	2.2 46	2 53	1.9 58	1.5 80	1.3 100	1.1 151	1 172		
300				3.6 26	2.9 34	2.5 41	2.2 48	2 54	1.9 60	1.5 83	1.3 104	1.1 155	1 177		
310				3.6 27	2.9 35	2.5 42	2.2 49	2 56	1.9 62	1.5 86	1.3 107	1.1 159	1 182		
320				3.6 28	2.9 36	2.5 44	2.2 51	2 58	1.9 64	1.5 89	1.3 111	1.1 163	1 186		
330				3.6 29	2.9 37	2.5 45	2.2 53	2 60	1.9 66	1.5 92	1.3 114	1.1 167	1 191		
340				3.6 30	2.9 38	2.5 46	2.2 54	2 62	1.9 68	1.5 94	1.3 118	1.1 171	1 196		
350				3.6 30	2.9 39	2.5 48	2.2 56	2 63	1.9 71	1.5 97	1.3 121	1.1 175	1 200		
360				3.6 31	2.9 40	2.5 49	2.2 57	2 65	1.9 73	1.5 100	1.3 124	1.1 179	1 205		
370				3.6 32	2.9 42	2.5 50	2.2 59	2 67	1.9 75	1.5 103	1.3 128	1.1 183			
380				3.6 33	2.9 43	2.5 52	2.2 60	2 69	1.9 77	1.5 105	1.3 131	1.1 188			
390				3.6 34	2.9 44	2.5 53	2.2 62	2 71	1.9 79	1.5 108	1.3 135	1.1 192			
400				3.6 35	2.9 45	2.5 55	2.2 64	2 72	1.9 81	1.5 111	1.3 138	1.1 196			
410				3.6 36	2.9 46	2.5 56	2.2 65	2 74	1.9 83	1.5 114	1.3 142	1.1 200			
420		5 25		3.6 36	2.9 47	2.5 57	2.2 67	2 76	1.9 85	1.5 116	1.3 145	1.1 204			
430		5 26		3.6 37	2.9 48	2.5 59	2.2 68	2 78	1.9 87	1.5 119	1.3 149				
440		5 26		3.6 38	2.9 49	2.5 60	2.2 70	2 80	1.9 89	1.5 122	1.3 152				
450		5 27		3.6 39	2.9 50	2.5 61	2.2 72	2 81	1.9 91	1.5 125	1.3 156				
460		5 28		3.6 40	2.9 52	2.5 63	2.2 73	2 83	1.9 93	1.5 128	1.3 159				
470		5 28		3.6 41	2.9 53	2.5 64	2.2 75	2 85	1.9 95	1.5 131	1.3 163				
480		4.9 29		3.6 42	2.9 54	2.5 65	2.2 76	2 87	1.9 97	1.5 133	1.3 166				
490		4.9 29		3.6 42	2.9 55	2.5 67	2.2 78	2 89	1.9 99	1.5 136	1.3 169				
500		4.9 30		3.6 43	2.9 56	2.5 68	2.2 80	2 90	1.9 101	1.5 139	1.3 173				

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10															0.8 7
20													1.2 7	1 9	0.8 13
30												1.3 9	1.2 10	1 13	0.8 20
40											1.5 10	1.3 11	1.2 13	1 17	0.8 26
50										1.8 10	1.5 12	1.3 14	1.2 16	1 21	0.8 33
60										1.7 11	1.4 14	1.3 17	1.1 20	1 26	0.8 39
70										1.7 13	1.4 17	1.3 20	1.1 23	1 30	0.8 46
80										1.7 15	1.4 19	1.3 23	1.1 26	1 34	0.8 52
90									2.3 12	1.7 17	1.4 22	1.3 26	1.1 29	1 38	0.8 59
100									2.2 14	1.7 19	1.4 24	1.3 28	1.1 33	1 43	0.8 65
110								2.5 13	2.2 15	1.7 21	1.4 26	1.3 31	1.1 36	1 47	0.8 72
120								2.5 15	2.2 16	1.7 23	1.4 29	1.3 34	1.1 39	1 51	0.8 78
130							2.7 14	2.4 16	2.2 18	1.7 25	1.4 31	1.3 37	1.1 42	1 55	0.8 85
140							2.7 15	2.4 17	2.2 19	1.7 27	1.4 33	1.3 40	1.1 46	1 59	0.8 91
150							2.7 16	2.4 18	2.2 20	1.7 28	1.4 36	1.3 43	1.1 49	1 64	0.8 98
160							2.7 17	2.4 19	2.2 22	1.7 30	1.4 38	1.3 45	1.1 52	1 68	0.8 104
170							2.7 18	2.4 21	2.2 23	1.7 32	1.4 41	1.3 48	1.1 56	1 72	0.8 111
180						3.1 16	2.7 19	2.4 22	2.2 24	1.7 34	1.4 43	1.3 51	1.1 59	1 76	0.8 117
190						3.1 17	2.7 20	2.4 23	2.2 26	1.7 36	1.4 45	1.3 54	1.1 62	1 81	0.8 124
200						3.1 18	2.7 21	2.4 24	2.2 27	1.7 38	1.4 48	1.3 57	1.1 65	1 85	0.8 130
210						3.1 19	2.7 22	2.4 25	2.2 28	1.7 40	1.4 50	1.3 60	1.1 69	1 89	0.8 137
220						3.1 20	2.7 23	2.4 27	2.2 30	1.7 42	1.4 53	1.3 63	1.1 72	1 93	0.8 143
230						3.1 21	2.7 24	2.4 28	2.2 31	1.7 44	1.4 55	1.3 65	1.1 75	1 98	0.8 150
240						3.1 22	2.7 25	2.4 29	2.2 32	1.7 46	1.4 57	1.3 68	1.1 78	1 102	0.8 156
250					3.7 18	3.1 22	2.7 26	2.4 30	2.2 34	1.7 47	1.4 60	1.3 71	1.1 82	1 106	0.8 163
260					3.7 19	3.1 23	2.7 27	2.4 31	2.2 35	1.7 49	1.4 62	1.3 74	1.1 85	1 110	
270					3.6 20	3 24	2.7 28	2.4 33	2.2 36	1.7 51	1.4 64	1.3 77	1.1 88	1 115	
280					3.6 21	3 25	2.7 29	2.4 34	2.2 38	1.7 53	1.4 67	1.3 80	1.1 91	1 119	
290					3.6 21	3 26	2.7 31	2.4 35	2.2 39	1.7 55	1.4 69	1.3 82	1.1 95	1 123	
300					3.6 22	3 27	2.7 32	2.4 36	2.2 41	1.7 57	1.4 72	1.3 85	1.1 98	1 127	
310					3.6 23	3 28	2.7 33	2.4 37	2.2 42	1.7 59	1.4 74	1.3 88	1.1 101	1 131	
320					3.6 23	3 29	2.7 34	2.4 39	2.2 43	1.7 61	1.4 76	1.3 91	1.1 105	1 136	
330					3.6 24	3 30	2.7 35	2.4 40	2.2 45	1.7 63	1.4 79	1.3 94	1.1 108	1 140	
340					3.6 25	3 30	2.7 36	2.4 41	2.2 46	1.7 64	1.4 81	1.3 97	1.1 111	1 144	
350					3.6 26	3 31	2.6 37	2.4 42	2.2 47	1.7 66	1.4 84	1.3 99	1.1 114	1 148	
360					3.6 26	3 32	2.6 38	2.4 43	2.2 49	1.7 68	1.4 86	1.3 102	1.1 118	1 153	
370					3.6 27	3 33	2.6 39	2.4 44	2.2 50	1.7 70	1.4 88	1.3 105	1.1 121	1 157	
380					3.6 28	3 34	2.6 40	2.4 46	2.2 51	1.7 72	1.4 91	1.3 108	1.1 124	1 161	
390					3.6 28	3 35	2.6 41	2.4 47	2.2 53	1.7 74	1.4 93	1.3 111	1.1 127	1 165	
400					3.6 29	3 36	2.6 42	2.4 48	2.2 54	1.7 76	1.4 95	1.3 114	1.1 131	1 170	
410				4.6 23	3.6 30	3 37	2.6 43	2.4 49	2.2 55	1.7 78	1.4 98	1.3 116	1.1 134	1 174	
420				4.6 23	3.6 30	3 37	2.6 44	2.4 50	2.2 57	1.7 80	1.4 100	1.3 119	1.1 137	1 178	
430				4.6 24	3.6 31	3 38	2.6 45	2.4 52	2.2 58	1.7 81	1.4 103	1.3 122	1.1 140	1 182	
440				4.6 25	3.6 32	3 39	2.6 46	2.4 53	2.2 59	1.7 83	1.4 105	1.3 125	1.1 144	1 187	
450				4.6 25	3.6 33	3 40	2.6 47	2.4 54	2.2 61	1.7 85	1.4 107	1.3 128	1.1 147	1 191	
460				4.6 26	3.6 33	3 41	2.6 48	2.4 55	2.2 62	1.7 87	1.4 110	1.3 131	1.1 150		
470				4.6 26	3.6 34	3 42	2.6 49	2.4 56	2.2 63	1.7 89	1.4 112	1.3 134	1.1 154		
480				4.5 27	3.6 35	3 43	2.6 50	2.4 58	2.2 65	1.7 91	1.4 115	1.3 136	1.1 157		
490				4.5 27	3.6 35	3 44	2.6 51	2.4 59	2.2 66	1.7 93	1.4 117	1.3 139	1.1 160		
500				4.5 28	3.6 36	3 44	2.6 52	2.4 60	2.2 67	1.7 95	1.4 119	1.3 142	1.1 163		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.02

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10									1.6 8	1.3 11	1.1 7	1 8	0.9 9	0.8 11	0.7 13
20											1.1 14	1 16	0.9 18	0.8 22	0.7 25
30									1.5 12	1.2 17	1.1 20	1 24	0.9 27	0.8 32	0.7 38
40						2 12	1.8 13	1.6 15	1.5 17	1.2 22	1.1 27	1 32	0.9 36	0.8 43	0.7 50
50					2.3 12	2 15	1.8 17	1.6 19	1.5 21	1.2 28	1.1 34	1 39	0.9 45	0.8 54	0.7 63
60					2.2 15	1.9 18	1.7 20	1.6 23	1.5 25	1.2 33	1.1 41	1 47	0.9 54	0.8 65	0.7 75
70				2.7 14	2.2 17	1.9 20	1.7 23	1.6 26	1.5 29	1.2 39	1.1 47	1 55	0.9 62	0.8 76	0.7 88
80				2.6 16	2.2 20	1.9 23	1.7 27	1.6 30	1.5 33	1.2 44	1.1 54	1 63	0.9 71	0.8 86	0.7 100
90				2.6 18	2.2 22	1.9 26	1.7 30	1.6 34	1.5 37	1.2 50	1.1 61	1 71	0.9 80	0.8 97	0.7 113
100				2.6 20	2.2 24	1.9 29	1.7 33	1.6 37	1.5 41	1.2 55	1.1 68	1 79	0.9 89	0.8 108	0.7 125
110				2.6 21	2.2 27	1.9 32	1.7 37	1.6 41	1.5 46	1.2 61	1.1 75	1 87	0.9 98	0.8 119	0.7 138
120				2.6 23	2.2 29	1.9 35	1.7 40	1.6 45	1.5 50	1.2 66	1.1 81	1 95	0.9 107	0.8 130	
130			3.4 18	2.6 25	2.2 32	1.9 38	1.7 43	1.6 49	1.5 54	1.2 72	1.1 88	1 103	0.9 116	0.8 141	
140			3.4 20	2.6 27	2.2 34	1.9 41	1.7 47	1.6 52	1.5 58	1.2 78	1.1 95	1 110	0.9 125	0.8 151	
150			3.4 21	2.6 29	2.2 37	1.9 44	1.7 50	1.6 56	1.5 62	1.2 83	1.1 102	1 118	0.9 134		
160			3.4 22	2.6 31	2.2 39	1.9 47	1.7 53	1.6 60	1.5 66	1.2 89	1.1 108	1 126	0.9 143		
170			3.3 24	2.6 33	2.2 42	1.9 49	1.7 57	1.6 64	1.5 70	1.2 94	1.1 115	1 134	0.9 152		
180			3.3 25	2.6 35	2.2 44	1.9 52	1.7 60	1.6 68	1.5 74	1.2 100	1.1 122	1 142	0.9 161		
190			3.3 27	2.6 37	2.2 46	1.9 55	1.7 63	1.6 71	1.5 79	1.2 105	1.1 129	1 150	0.9 169		
200			3.3 28	2.6 39	2.2 49	1.9 58	1.7 67	1.6 75	1.5 83	1.2 111	1.1 135	1 158	0.9 178		
210			3.3 29	2.5 41	2.2 51	1.9 61	1.7 70	1.6 79	1.5 87	1.2 116	1.1 142	1 166			
220			3.3 31	2.5 43	2.2 54	1.9 64	1.7 73	1.6 82	1.5 91	1.2 122	1.1 149	1 173			
230			3.3 32	2.5 45	2.2 56	1.9 67	1.7 77	1.6 86	1.5 95	1.2 127	1.1 156	1 181			
240			3.3 33	2.5 47	2.2 59	1.9 70	1.7 80	1.6 90	1.5 99	1.2 133	1.1 163	1 189			
250			3.3 35	2.5 49	2.2 61	1.9 73	1.7 83	1.6 94	1.5 103	1.2 138	1.1 169				
260			3.3 36	2.5 50	2.2 63	1.9 76	1.7 87	1.6 97	1.5 108	1.2 144	1.1 176				
270			3.3 38	2.5 52	2.1 66	1.9 78	1.7 90	1.6 101	1.5 112	1.2 149	1.1 183				
280			3.3 39	2.5 54	2.1 68	1.9 81	1.7 93	1.6 105	1.5 116	1.2 155	1.1 190				
290			3.3 40	2.5 56	2.1 71	1.9 84	1.7 97	1.6 109	1.5 120	1.2 161	1.1 196				
300			3.3 42	2.5 58	2.1 73	1.9 87	1.7 100	1.6 112	1.5 124	1.2 166	1.1 203				
310			3.3 43	2.5 60	2.1 76	1.9 90	1.7 103	1.6 116	1.5 128	1.2 172	1.1 210				
320			3.3 44	2.5 62	2.1 78	1.9 93	1.7 107	1.6 120	1.5 132	1.2 177					
330			3.3 46	2.5 64	2.1 81	1.9 96	1.7 110	1.6 124	1.5 136	1.2 183					
340			3.3 47	2.5 66	2.1 83	1.9 99	1.7 113	1.6 127	1.5 141	1.2 188					
350			3.3 49	2.5 68	2.1 86	1.9 102	1.7 117	1.6 131	1.5 145	1.2 194					
360			3.3 50	2.5 70	2.1 88	1.9 105	1.7 120	1.6 135	1.5 149	1.2 199					
370		5.5 28	3.3 51	2.5 72	2.1 90	1.9 107	1.7 123	1.6 139	1.5 153	1.2 205					
380		5.5 29	3.3 53	2.5 74	2.1 93	1.9 110	1.7 127	1.6 142	1.5 157	1.2 210					
390		5.5 30	3.3 54	2.5 76	2.1 95	1.9 113	1.7 130	1.6 146	1.5 161	1.2 216					
400		5.5 30	3.3 55	2.5 78	2.1 98	1.9 116	1.7 134	1.6 150	1.5 165	1.2 221					
410		5.4 31	3.3 57	2.5 80	2.1 100	1.9 119	1.7 137	1.6 154	1.5 170	1.2 227					
420		5.4 32	3.3 58	2.5 82	2.1 103	1.9 122	1.7 140	1.6 157	1.5 174	1.2 232					
430		5.4 32	3.3 60	2.5 84	2.1 105	1.9 125	1.7 144	1.6 161	1.5 178	1.2 238					
440		5.4 33	3.3 61	2.5 85	2.1 107	1.9 128	1.7 147	1.6 165	1.5 182	1.2 244					
450		5.4 34	3.3 62	2.5 87	2.1 110	1.9 131	1.7 150	1.6 169	1.5 186						
460		5.4 35	3.3 64	2.5 89	2.1 112	1.9 134	1.7 154	1.6 172	1.5 190						
470		5.4 35	3.3 65	2.5 91	2.1 115	1.9 137	1.7 157	1.6 176	1.5 194						
480		5.4 36	3.3 66	2.5 93	2.1 117	1.9 139	1.7 160	1.6 180	1.5 198						
490		5.4 37	3.3 68	2.5 95	2.1 120	1.9 142	1.7 164	1.6 184	1.5 203						
500		5.4 37	3.3 69	2.5 97	2.1 122	1.9 145	1.7 167	1.6 187	1.5 207						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.03

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10										1.5 7	1.2 9	1.1 11	1 6	0.9 7	0.8 9
20										1.4 11	1.2 14	1.1 16	1 12	0.9 15	0.8 17
30										1.4 15	1.2 18	1.1 21	1 18	0.9 22	0.8 26
40								1.9 10	1.8 11	1.4 18	1.2 22	1.1 26	1 24	0.9 29	0.8 34
50							2.1 11	1.9 12	1.7 13	1.4 22	1.2 27	1.1 32	1 30	0.9 37	0.8 43
60							2.1 13	1.9 15	1.7 16	1.4 25	1.2 31	1.1 37	1 36	0.9 44	0.8 51
70						2.3 13	2 15	1.9 17	1.7 19	1.4 29	1.2 36	1.1 42	1 42	0.9 51	0.8 60
80						2.3 15	2 17	1.8 19	1.7 21	1.4 33	1.2 40	1.1 47	1 48	0.9 59	0.8 68
90					2.7 14	2.3 17	2 19	1.8 22	1.7 24	1.4 40	1.2 45	1.1 53	1 54	0.9 66	0.8 77
100					2.6 15	2.3 18	2 21	1.8 24	1.7 27	1.4 44	1.2 50	1.1 58	1 60	0.9 73	0.8 85
110					2.6 17	2.3 20	2 23	1.8 27	1.7 29	1.4 49	1.2 55	1.1 63	1 66	0.9 81	0.8 94
120					2.6 18	2.3 22	2 26	1.8 29	1.7 32	1.4 54	1.2 60	1.1 68	1 72	0.9 88	0.8 102
130					2.6 20	2.2 24	2 28	1.8 31	1.7 35	1.4 58	1.2 65	1.1 74	1 78	0.9 95	0.8 111
140				3.2 17	2.6 21	2.2 26	2 30	1.8 34	1.7 37	1.4 62	1.2 70	1.1 79	1 84	0.9 103	0.8 119
150				3.2 18	2.6 23	2.2 28	2 32	1.8 36	1.7 40	1.4 65	1.2 73	1.1 81	1 90	0.9 110	0.8 128
160				3.2 19	2.6 25	2.2 29	2 34	1.8 39	1.7 43	1.4 69	1.2 76	1.1 84	1 96	0.9 117	0.8 136
170				3.2 21	2.6 26	2.2 31	2 36	1.8 41	1.7 45	1.4 73	1.2 80	1.1 90	1 102	0.9 125	0.8 145
180				3.1 22	2.6 28	2.2 33	2 38	1.8 43	1.7 48	1.4 76	1.2 83	1.1 95	1 108	0.9 132	0.8 153
190				3.1 23	2.6 29	2.2 35	2 41	1.8 46	1.7 51	1.4 80	1.2 86	1.1 100	1 114	0.9 139	
200				3.1 24	2.6 31	2.2 37	2 43	1.8 48	1.7 53	1.4 84	1.2 89	1.1 105	1 120	0.9 147	
210				3.1 25	2.6 32	2.2 39	2 45	1.8 51	1.7 56	1.4 87	1.2 92	1.1 111	1 126	0.9 154	
220				3.1 26	2.6 34	2.2 40	2 47	1.8 53	1.7 59	1.4 91	1.2 95	1.1 116	1 132	0.9 161	
230				3.1 28	2.6 35	2.2 42	2 49	1.8 55	1.7 61	1.4 95	1.2 98	1.1 121	1 138	0.9 169	
240				3.1 29	2.6 37	2.2 44	2 51	1.8 58	1.7 64	1.4 98	1.2 101	1.1 126	1 144		
250				3.1 30	2.6 38	2.2 46	2 53	1.8 60	1.7 67	1.4 102	1.2 104	1.1 132	1 150		
260			4.2 22	3.1 31	2.6 40	2.2 48	2 55	1.8 63	1.7 69	1.4 105	1.2 107	1.1 137	1 156		
270			4.2 23	3.1 32	2.6 41	2.2 50	2 58	1.8 65	1.7 72	1.4 109	1.2 110	1.1 142	1 162		
280			4.2 24	3.1 33	2.6 43	2.2 51	2 60	1.8 67	1.7 75	1.4 113	1.2 113	1.1 148	1 168		
290			4.2 24	3.1 35	2.6 44	2.2 53	2 62	1.8 70	1.7 77	1.4 116	1.2 116	1.1 153	1 174		
300			4.2 25	3.1 36	2.6 46	2.2 55	2 64	1.8 72	1.7 80	1.4 120	1.2 119	1.1 158	1 180		
310			4.2 26	3.1 37	2.6 47	2.2 57	2 66	1.8 75	1.7 83	1.4 124	1.2 122	1.1 163	1 186		
320			4.2 27	3.1 38	2.6 49	2.2 59	2 68	1.8 77	1.7 85	1.4 127	1.2 125	1.1 169	1 192		
330			4.2 28	3.1 39	2.6 50	2.2 61	2 70	1.8 79	1.7 88	1.4 131	1.2 128	1.1 174			
340			4.2 28	3.1 41	2.6 52	2.2 62	2 72	1.8 82	1.7 91	1.4 135	1.2 131	1.1 179			
350			4.2 29	3.1 42	2.6 53	2.2 64	2 75	1.8 84	1.7 93	1.4 138	1.2 134	1.1 184			
360			4.2 30	3.1 43	2.6 55	2.2 66	2 77	1.8 87	1.7 96	1.4 142	1.2 137	1.1 190			
370			4.2 31	3.1 44	2.6 56	2.2 68	2 79	1.8 89	1.7 99	1.4 145	1.2 140	1.1 195			
380			4.2 32	3.1 45	2.6 58	2.2 70	2 81	1.8 91	1.7 101	1.4 149	1.2 143	1.1 200			
390			4.2 32	3.1 46	2.6 59	2.2 72	2 83	1.8 94	1.7 104	1.4 153	1.2 146	1.1 206			
400			4.2 33	3.1 48	2.6 61	2.2 73	2 85	1.8 96	1.7 107	1.4 156	1.2 149	1.1 211			
410			4.2 34	3.1 49	2.6 62	2.2 75	2 87	1.8 99	1.7 109	1.4 160	1.2 152				
420			4.1 35	3.1 50	2.6 64	2.2 77	2 89	1.8 101	1.7 112	1.4 164	1.2 155				
430			4.1 36	3.1 51	2.6 66	2.2 79	2 92	1.8 103	1.7 115	1.4 167	1.2 158				
440			4.1 36	3.1 52	2.6 67	2.2 81	2 94	1.8 106	1.7 117	1.4 171	1.2 161				
450			4.1 37	3.1 54	2.6 69	2.2 83	2 96	1.8 108	1.7 120	1.4 174	1.2 164				
460			4.1 38	3.1 55	2.6 70	2.2 84	2 98	1.8 111	1.7 123	1.4 178	1.2 167				
470			4.1 39	3.1 56	2.6 72	2.2 86	2 100	1.8 113	1.7 125	1.4 182	1.2 170				
480			4.1 40	3.1 57	2.6 73	2.2 88	2 102	1.8 115	1.7 128	1.4 186	1.2 173				
490			4.1 41	3.1 58	2.5 75	2.2 90	2 104	1.8 118	1.7 131	1.4 190	1.2 176				
500			4.1 41	3.1 60	2.5 76	2.2 92	2 106	1.8 120	1.7 133	1.4 194	1.2 179				

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.05

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10															0.8 7
20													1.2 7	1 9	0.8 13
30											1.5 8	1.3 9	1.1 11	1 13	0.8 20
40											1.4 10	1.2 12	1.1 14	1 18	0.8 26
50										1.7 10	1.4 13	1.2 15	1.1 18	1 22	0.8 33
60										1.7 12	1.4 16	1.2 19	1.1 21	1 26	0.8 40
70										1.7 15	1.4 18	1.2 22	1.1 25	1 31	0.8 46
80									2.2 12	1.7 17	1.4 21	1.2 25	1.1 28	1 35	0.8 53
90								2.4 12	2.2 13	1.7 19	1.4 23	1.2 28	1.1 32	1 39	0.8 59
100								2.4 13	2.2 15	1.7 21	1.4 26	1.2 31	1.1 35	1 44	0.8 66
110								2.4 15	2.1 16	1.6 23	1.4 29	1.2 34	1.1 39	1 48	0.8 72
120							2.6 14	2.3 16	2.1 18	1.6 25	1.4 31	1.2 37	1.1 42	1 52	0.8 79
130							2.6 15	2.3 17	2.1 19	1.6 27	1.4 34	1.2 40	1.1 46	1 57	0.8 85
140							2.6 16	2.3 19	2.1 21	1.6 29	1.4 36	1.2 43	1.1 50	1 61	0.8 92
150						3 15	2.6 18	2.3 20	2.1 22	1.6 31	1.4 39	1.2 46	1.1 53	1 66	0.8 98
160						3 16	2.6 19	2.3 21	2.1 24	1.6 33	1.4 42	1.2 49	1.1 57	1 70	0.8 105
170						3 17	2.6 20	2.3 23	2.1 25	1.6 35	1.4 44	1.2 52	1.1 60	1 74	0.8 112
180						3 18	2.6 21	2.3 24	2.1 27	1.6 37	1.4 47	1.2 55	1.1 64	1 79	0.8 118
190						2.9 19	2.6 22	2.3 25	2.1 28	1.6 39	1.4 49	1.2 59	1.1 67	1 83	0.8 125
200						2.9 20	2.6 23	2.3 26	2.1 30	1.6 41	1.4 52	1.2 62	1.1 71	1 87	0.8 131
210						2.9 21	2.6 24	2.3 28	2.1 31	1.6 43	1.4 55	1.2 65	1.1 74	1 92	0.8 138
220					3.5 18	2.9 22	2.6 25	2.3 29	2.1 33	1.6 45	1.4 57	1.2 68	1.1 78	1 96	0.8 144
230					3.5 19	2.9 23	2.6 27	2.3 30	2.1 34	1.6 48	1.4 60	1.2 71	1.1 81	1 101	0.8 151
240					3.5 20	2.9 24	2.6 28	2.3 32	2.1 35	1.6 50	1.4 62	1.2 74	1.1 85	1 105	0.8 158
250					3.5 20	2.9 25	2.6 29	2.3 33	2.1 37	1.6 52	1.4 65	1.2 77	1.1 88	1 109	
260					3.5 21	2.9 26	2.6 30	2.3 34	2.1 38	1.6 54	1.4 68	1.2 80	1.1 92	1 114	
270					3.5 22	2.9 27	2.6 31	2.3 36	2.1 40	1.6 56	1.4 70	1.2 83	1.1 95	1 118	
280					3.4 23	2.9 28	2.5 32	2.3 37	2.1 41	1.6 58	1.4 73	1.2 86	1.1 99	1 122	
290					3.4 23	2.9 29	2.5 33	2.3 38	2.1 43	1.6 60	1.4 75	1.2 89	1.1 103	1 127	
300					3.4 24	2.9 29	2.5 35	2.3 40	2.1 44	1.6 62	1.4 78	1.2 92	1.1 106	1 131	
310					3.4 25	2.9 30	2.5 36	2.3 41	2.1 46	1.6 64	1.4 80	1.2 95	1.1 110	1 135	
320					3.4 26	2.9 31	2.5 37	2.3 42	2.1 47	1.6 66	1.4 83	1.2 99	1.1 113	1 140	
330					3.4 27	2.9 32	2.5 38	2.3 43	2.1 49	1.6 68	1.4 86	1.2 102	1.1 117	1 144	
340					3.4 27	2.9 33	2.5 39	2.3 45	2.1 50	1.6 70	1.4 88	1.2 105	1.1 120	1 149	
350				4.3 22	3.4 28	2.9 34	2.5 40	2.3 46	2.1 52	1.6 72	1.4 91	1.2 108	1.1 124	1 153	
360				4.3 22	3.4 29	2.9 35	2.5 41	2.3 47	2.1 53	1.6 74	1.4 93	1.2 111	1.1 127	1 157	
370				4.3 23	3.4 30	2.9 36	2.5 43	2.3 49	2.1 55	1.6 76	1.4 96	1.2 114	1.1 131	1 162	
380				4.3 24	3.4 30	2.9 37	2.5 44	2.3 50	2.1 56	1.6 78	1.4 99	1.2 117	1.1 134	1 166	
390				4.3 24	3.4 31	2.9 38	2.5 45	2.3 51	2.1 58	1.6 81	1.4 101	1.2 120	1.1 138	1 170	
400				4.3 25	3.4 32	2.9 39	2.5 46	2.3 53	2.1 59	1.6 83	1.4 104	1.2 123	1.1 141	1 175	
410				4.3 25	3.4 33	2.9 40	2.5 47	2.3 54	2.1 61	1.6 85	1.4 106	1.2 126	1.1 145	1 179	
420				4.3 26	3.4 34	2.9 41	2.5 48	2.3 55	2.1 62	1.6 87	1.4 109	1.2 129	1.1 148	1 184	
430				4.3 26	3.4 34	2.9 42	2.5 50	2.3 57	2.1 63	1.6 89	1.4 112	1.2 132	1.1 152	1 188	
440				4.3 27	3.4 35	2.9 43	2.5 51	2.3 58	2.1 65	1.6 91	1.4 114	1.2 136	1.1 156	1 192	
450				4.3 28	3.4 36	2.9 44	2.5 52	2.3 59	2.1 66	1.6 93	1.4 117	1.2 139	1.1 159		
460				4.3 28	3.4 37	2.9 45	2.5 53	2.3 61	2.1 68	1.6 95	1.4 119	1.2 142	1.1 163		
470				4.3 29	3.4 38	2.9 46	2.5 54	2.3 62	2.1 69	1.6 97	1.4 122	1.2 145	1.1 166		
480				4.3 29	3.4 38	2.9 47	2.5 55	2.3 63	2.1 71	1.6 99	1.4 125	1.2 148	1.1 170		
490				4.3 30	3.4 39	2.9 48	2.5 56	2.3 65	2.1 72	1.6 101	1.4 127	1.2 151	1.1 173		
500				4.3 31	3.4 40	2.9 49	2.5 58	2.3 66	2.1 74	1.6 103	1.4 130	1.2 154	1.1 177		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.07

B-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10															0.8 7
20														1 9	0.8 13
30													1.2 8	1 13	0.8 20
40												1.4 9	1.2 11	1 17	0.8 26
50											1.7 9	1.4 11	1.2 13	1 22	0.8 33
60											1.6 11	1.4 13	1.2 16	1 26	0.8 39
70											1.6 12	1.4 15	1.2 18	1 30	0.8 46
80										2 11	1.6 14	1.4 17	1.2 21	1 34	0.8 52
90										2 13	1.6 16	1.4 19	1.2 24	1 39	0.8 59
100										2 14	1.6 18	1.4 21	1.2 26	1 43	0.8 66
110										1.9 15	1.6 19	1.4 23	1.2 29	1 47	0.8 72
120										1.9 17	1.6 21	1.4 25	1.2 31	1 52	0.8 79
130										1.9 18	1.6 23	1.4 28	1.2 34	1 56	0.8 85
140									2.6 14	1.9 20	1.6 25	1.4 30	1.2 37	1 60	0.8 92
150									2.6 15	1.9 21	1.6 26	1.4 32	1.2 39	1 64	0.8 98
160									2.6 16	1.9 22	1.6 28	1.4 34	1.2 42	1 69	0.8 105
170								2.9 15	2.6 17	1.9 24	1.6 30	1.4 36	1.2 44	1 73	0.8 111
180								2.8 16	2.6 18	1.9 25	1.6 32	1.4 38	1.2 47	1 77	0.8 118
190								2.8 17	2.6 19	1.9 26	1.6 34	1.4 40	1.2 50	1 82	0.8 125
200								2.8 17	2.5 20	1.9 28	1.6 35	1.4 42	1.2 52	1 86	0.8 131
210							3.2 16	2.8 18	2.5 21	1.9 29	1.6 37	1.4 44	1.2 55	1 90	0.8 138
220							3.2 17	2.8 19	2.5 22	1.9 31	1.6 39	1.4 47	1.2 57	1 94	0.8 144
230							3.2 17	2.8 20	2.5 22	1.9 32	1.6 41	1.4 49	1.2 60	1 99	0.8 151
240							3.2 18	2.8 21	2.5 23	1.9 33	1.6 42	1.4 51	1.2 63	1 103	0.8 157
250							3.2 19	2.8 22	2.5 24	1.9 35	1.6 44	1.4 53	1.2 65	1 107	0.8 164
260							3.2 20	2.8 22	2.5 25	1.9 36	1.6 46	1.4 55	1.2 68	1 112	
270							3.2 20	2.8 23	2.5 26	1.9 37	1.6 48	1.4 57	1.2 70	1 116	
280							3.2 21	2.8 24	2.5 27	1.9 39	1.6 49	1.4 59	1.2 73	1 120	
290						3.7 19	3.1 22	2.8 25	2.5 28	1.9 40	1.6 51	1.4 61	1.2 76	1 124	
300						3.7 19	3.1 22	2.8 26	2.5 29	1.9 42	1.6 53	1.4 64	1.2 78	1 129	
310						3.7 20	3.1 23	2.8 27	2.5 30	1.9 43	1.6 55	1.4 66	1.2 81	1 133	
320						3.7 20	3.1 24	2.8 28	2.5 31	1.9 44	1.6 57	1.4 68	1.2 84	1 137	
330						3.6 21	3.1 25	2.8 28	2.5 32	1.9 46	1.6 58	1.4 70	1.2 86	1 142	
340						3.6 22	3.1 25	2.8 29	2.5 33	1.9 47	1.6 60	1.4 72	1.2 89	1 146	
350						3.6 22	3.1 26	2.8 30	2.5 34	1.9 49	1.6 62	1.4 74	1.2 91	1 150	
360						3.6 23	3.1 27	2.8 31	2.5 35	1.9 50	1.6 64	1.4 76	1.2 94	1 154	
370						3.6 23	3.1 28	2.8 32	2.5 36	1.9 51	1.6 65	1.4 78	1.2 97	1 159	
380						3.6 24	3.1 28	2.8 33	2.5 37	1.9 53	1.6 67	1.4 80	1.2 99	1 163	
390						3.6 25	3.1 29	2.8 34	2.5 38	1.9 54	1.6 69	1.4 83	1.2 102	1 167	
400						3.6 25	3.1 30	2.8 34	2.5 39	1.9 55	1.6 71	1.4 85	1.2 104	1 172	
410						3.6 26	3.1 31	2.8 35	2.5 40	1.9 57	1.6 72	1.4 87	1.2 107	1 176	
420						3.6 26	3.1 31	2.8 36	2.5 41	1.9 58	1.6 74	1.4 89	1.2 110	1 180	
430					4.4 22	3.6 27	3.1 32	2.8 37	2.5 42	1.9 60	1.6 76	1.4 91	1.2 112	1 185	
440					4.4 23	3.6 28	3.1 33	2.8 38	2.5 43	1.9 61	1.6 78	1.4 93	1.2 115	1 189	
450					4.4 23	3.6 28	3.1 33	2.8 39	2.5 44	1.9 62	1.6 79	1.4 95	1.2 117	1 193	
460					4.4 23	3.6 29	3.1 34	2.8 39	2.5 45	1.9 64	1.6 81	1.4 97	1.2 120		
470					4.4 24	3.6 29	3.1 35	2.8 40	2.5 46	1.9 65	1.6 83	1.4 99	1.2 123		
480					4.4 24	3.6 30	3.1 36	2.8 41	2.5 46	1.9 67	1.6 85	1.4 102	1.2 125		
490					4.4 25	3.6 31	3.1 36	2.8 42	2.5 47	1.9 68	1.6 87	1.4 104	1.2 128		
500					4.4 25	3.6 31	3.1 37	2.8 43	2.5 48	1.9 69	1.6 88	1.4 106	1.2 130		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10							1.2	9	1.1	10	0.9	12	0.9	13	0.8	15	0.8	16	0.6	20	0.6	23	0.5	27	0.5	29	0.4	34	0.4	39
20					1.5	14	1.2	18	1	21	0.9	24	0.9	27	0.8	29	0.8	32	0.6	40	0.6	47	0.5	53	0.5	59	0.4	68	0.4	77
30			2.2	13	1.5	20	1.2	26	1	32	0.9	36	0.9	40	0.8	44	0.8	48	0.6	60	0.6	70	0.5	80	0.5	88				
40			2.1	17	1.5	27	1.2	35	1	42	0.9	48	0.9	54	0.8	59	0.8	63	0.6	80	0.6	94								
50			2.1	21	1.5	34	1.2	44	1	52	0.9	60	0.9	67	0.8	73	0.8	79	0.6	100										
60			2.1	26	1.5	41	1.2	53	1	63	0.9	72	0.9	80	0.8	88	0.8	95	0.6	120										
70			2.1	30	1.5	48	1.2	62	1	73	0.9	84	0.9	94	0.8	103	0.8	111												
80			2.1	34	1.5	54	1.2	70	1	84	0.9	96	0.9	107	0.8	117	0.8	127												
90	3.7	20	2.1	39	1.5	61	1.2	79	1	94	0.9	108	0.9	121	0.8	132	0.8	143												
100	3.7	22	2.1	43	1.5	68	1.2	88	1	105	0.9	120	0.9	134	0.8	147														
110	3.6	24	2.1	47	1.5	75	1.2	97	1	115	0.9	132	0.9	147																
120	3.6	27	2.1	51	1.4	82	1.2	106	1	126	0.9	144	0.9	161																
130	3.6	29	2.1	56	1.4	88	1.2	114	1	136	0.9	156																		
140	3.6	31	2.1	60	1.4	95	1.2	123	1	147	0.9	168																		
150	3.6	33	2.1	64	1.4	102	1.2	132	1	157	0.9	180																		
160	3.6	35	2.1	69	1.4	109	1.2	141	1	168																				
170	3.6	38	2.1	73	1.4	116	1.2	150	1	178																				
180	3.6	40	2.1	77	1.4	122	1.2	158	1	189																				
190	3.6	42	2.1	82	1.4	129	1.2	167	1	199																				
200	3.6	44	2.1	86	1.4	136	1.2	176																						
210	3.6	47	2.1	90	1.4	143	1.2	185																						
220	3.6	49	2.1	94	1.4	150	1.2	194																						
230	3.6	51	2.1	99	1.4	156	1.2	202																						
240	3.6	53	2.1	103	1.4	163	1.2	211																						
250	3.6	55	2.1	107	1.4	170	1.2	220																						
260	3.6	58	2.1	112	1.4	177	1.2	229																						
270	3.6	60	2.1	116	1.4	184	1.2	238																						
280	3.6	62	2.1	120	1.4	190																								
290	3.6	64	2.1	125	1.4	197																								
300	3.6	66	2.1	129	1.4	204																								
310	3.6	69	2.1	133	1.4	211																								
320	3.6	71	2.1	137	1.4	218																								
330	3.5	73	2.1	142	1.4	224																								
340	3.5	75	2.1	146	1.4	231																								
350	3.5	77	2.1	150	1.4	238																								
360	3.5	80	2.1	155	1.4	245																								
370	3.5	82	2.1	159	1.4	252																								
380	3.5	84	2.1	163	1.4	259																								
390	3.5	86	2.1	167	1.4	265																								
400	3.5	89	2.1	172	1.4	272																								
410	3.5	91	2.1	176	1.4	279																								
420	3.5	93	2.1	180	1.4	286																								
430	3.5	95	2.1	185																										
440	3.5	97	2.1	189																										
450	3.5	100	2.1	193																										
460	3.5	102	2.1	197																										
470	3.5	104	2.1	202																										
480	3.5	106	2.1	206																										
490	3.5	109	2.1	210																										
500	3.5	111	2.1	215																										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10					1.7	9	1.4	12	1.2	7	1.1	8	1	9	0.9	10	0.8	11	0.7	14	0.6	17	0.6	19	0.5	21	0.5	25	0.4	28
20					1.7	14	1.3	18	1.2	15	1	17	1	19	0.9	21	0.8	22	0.7	29	0.6	34	0.6	38	0.5	43	0.5	50	0.4	57
30					1.7	19	1.3	24	1.2	22	1	25	0.9	28	0.9	31	0.8	34	0.7	43	0.6	51	0.6	58	0.5	64	0.5	75		
40					1.7	23	1.3	30	1.2	29	1	34	0.9	38	0.9	41	0.8	45	0.7	57	0.6	68	0.6	77	0.5	85				
50			2.5	14	1.7	23	1.3	30	1.2	37	1	42	0.9	47	0.9	52	0.8	56	0.7	72	0.6	85	0.6	96						
60			2.5	17	1.7	28	1.3	36	1.2	44	1	51	0.9	57	0.9	62	0.8	68	0.7	86	0.6	102								
70			2.5	20	1.7	32	1.3	43	1.2	51	1	59	0.9	66	0.9	73	0.8	79	0.7	100	0.6	119								
80			2.5	23	1.7	37	1.3	49	1.2	59	1	67	0.9	76	0.9	83	0.8	90	0.7	115										
90			2.5	26	1.7	42	1.3	55	1.2	66	1	76	0.9	85	0.9	93	0.8	101	0.7	129										
100			2.5	29	1.6	46	1.3	61	1.2	73	1	84	0.9	94	0.9	104	0.8	113												
110			2.4	31	1.6	51	1.3	67	1.2	81	1	93	0.9	104	0.9	114	0.8	124												
120			2.4	34	1.6	56	1.3	73	1.2	88	1	101	0.9	113	0.9	125	0.8	135												
130			2.4	37	1.6	60	1.3	79	1.2	95	1	110	0.9	123	0.9	135	0.8	146												
140			2.4	40	1.6	65	1.3	85	1.2	103	1	118	0.9	132	0.9	145	0.8	158												
150			2.4	43	1.6	70	1.3	91	1.2	110	1	127	0.9	142	0.9	156														
160	4.5	23	2.4	46	1.6	74	1.3	97	1.2	117	1	135	0.9	151	0.9	166														
170	4.5	24	2.4	48	1.6	79	1.3	103	1.2	125	1	143	0.9	161																
180	4.5	26	2.4	51	1.6	83	1.3	109	1.2	132	1	152	0.9	170																
190	4.5	27	2.4	54	1.6	88	1.3	115	1.2	139	1	160	0.9	179																
200	4.4	28	2.4	57	1.6	93	1.3	122	1.2	146	1	169	0.9	189																
210	4.4	30	2.4	60	1.6	97	1.3	128	1.2	154	1	177																		
220	4.4	31	2.4	63	1.6	102	1.3	134	1.2	161	1	186																		
230	4.4	32	2.4	65	1.6	107	1.3	140	1.2	168	1	194																		
240	4.4	34	2.4	68	1.6	111	1.3	146	1.2	176	1	202																		
250	4.4	35	2.4	71	1.6	116	1.3	152	1.2	183																				
260	4.4	37	2.4	74	1.6	121	1.3	158	1.2	190																				
270	4.4	38	2.4	77	1.6	125	1.3	164	1.2	198																				
280	4.4	39	2.4	80	1.6	130	1.3	170	1.2	205																				
290	4.4	41	2.4	83	1.6	134	1.3	176	1.2	212																				
300	4.4	42	2.4	85	1.6	139	1.3	182	1.2	220																				
310	4.4	44	2.4	88	1.6	144	1.3	188	1.2	227																				
320	4.4	45	2.4	91	1.6	148	1.3	195																						
330	4.4	46	2.4	94	1.6	153	1.3	201																						
340	4.4	48	2.4	97	1.6	158	1.3	207																						
350	4.4	49	2.4	100	1.6	162	1.3	213																						
360	4.4	51	2.4	103	1.6	167	1.3	219																						
370	4.4	52	2.4	105	1.6	172	1.3	225																						
380	4.4	53	2.4	108	1.6	176	1.3	231																						
390	4.4	55	2.4	111	1.6	181	1.3	237																						
400	4.4	56	2.4	114	1.6	185	1.3	243																						
410	4.3	57	2.4	117	1.6	190	1.3	249																						
420	4.3	59	2.4	120	1.6	195	1.3	255																						
430	4.3	60	2.4	122	1.6	199	1.3	261																						
440	4.3	62	2.4	125	1.6	204																								
450	4.3	63	2.4	128	1.6	209																								
460	4.3	64	2.4	131	1.6	213																								
470	4.3	66	2.4	134	1.6	218																								
480	4.3	67	2.4	137	1.6	223																								
490	4.3	69	2.4	140	1.6	227																								
500	4.3	70	2.4	142	1.6	232																								

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10							1.2 6	1.1 7	1 7	0.8 9	0.7 11	0.6 13	0.6 14	0.5 17	0.4 19
20					1.4 9	1.2 11	1.1 12	1 13	0.9 14	0.8 18	0.7 22	0.6 25	0.6 28	0.5 33	0.4 38
30				1.6 11	1.4 14	1.2 16	1.1 18	1 20	0.9 21	0.8 28	0.7 33	0.6 38	0.6 42	0.5 50	0.4 56
40			2.1 11	1.6 15	1.4 18	1.2 21	1.1 24	1 26	0.9 29	0.8 37	0.7 44	0.6 50	0.6 56	0.5 66	0.4 75
50			2.1 14	1.6 19	1.4 23	1.2 26	1.1 30	1 33	0.9 36	0.8 46	0.7 55	0.6 63	0.6 70	0.5 83	
60			2 17	1.6 22	1.4 27	1.2 32	1.1 36	1 39	0.9 43	0.8 55	0.7 66	0.6 76	0.6 84		
70			2 19	1.6 26	1.4 32	1.2 37	1.1 41	1 46	0.9 50	0.8 65	0.7 77	0.6 88	0.6 98		
80			2 22	1.6 30	1.4 36	1.2 42	1.1 47	1 52	0.9 57	0.8 74	0.7 88	0.6 101	0.6 112		
90			2 25	1.6 33	1.4 41	1.2 47	1.1 53	1 59	0.9 64	0.8 83	0.7 99	0.6 113			
100		3.2 16	2 28	1.6 37	1.4 45	1.2 53	1.1 59	1 66	0.9 71	0.8 92	0.7 110				
110		3.2 18	2 31	1.6 41	1.4 50	1.2 58	1.1 65	1 72	0.9 79	0.8 102	0.7 121				
120		3.2 20	2 33	1.6 44	1.3 54	1.2 63	1.1 71	1 79	0.9 86	0.8 111	0.7 132				
130		3.1 21	2 36	1.6 48	1.3 59	1.2 68	1.1 77	1 85	0.9 93	0.8 120					
140		3.1 23	2 39	1.6 52	1.3 63	1.2 74	1.1 83	1 92	0.9 100	0.8 129					
150		3.1 25	2 42	1.6 56	1.3 68	1.2 79	1.1 89	1 98	0.9 107	0.8 139					
160		3.1 26	2 44	1.6 59	1.3 72	1.2 84	1.1 95	1 105	0.9 114	0.8 148					
170		3.1 28	2 47	1.6 63	1.3 77	1.2 89	1.1 101	1 111	0.9 121						
180		3.1 29	2 50	1.6 67	1.3 81	1.2 95	1.1 107	1 118	0.9 129						
190		3.1 31	2 53	1.6 70	1.3 86	1.2 100	1.1 113	1 125	0.9 136						
200		3.1 33	2 55	1.6 74	1.3 90	1.2 105	1.1 119	1 131	0.9 143						
210		3.1 34	2 58	1.6 78	1.3 95	1.2 110	1.1 125	1 138	0.9 150						
220		3.1 36	2 61	1.6 82	1.3 99	1.2 116	1.1 131	1 144	0.9 157						
230		3.1 38	2 64	1.6 85	1.3 104	1.2 121	1.1 137	1 151	0.9 164						
240		3.1 39	2 67	1.6 89	1.3 109	1.2 126	1.1 143	1 157	0.9 171						
250		3.1 41	2 69	1.6 93	1.3 113	1.2 131	1.1 148	1 164	0.9 179						
260		3.1 42	2 72	1.6 96	1.3 118	1.2 137	1.1 154	1 170	0.9 186						
270		3.1 44	2 75	1.6 100	1.3 122	1.2 142	1.1 160	1 177							
280		3.1 46	2 78	1.6 104	1.3 127	1.2 147	1.1 166	1 184							
290		3.1 47	2 80	1.6 108	1.3 131	1.2 153	1.1 172	1 190							
300		3.1 49	2 83	1.6 111	1.3 136	1.2 158	1.1 178	1 197							
310		3.1 51	2 86	1.6 115	1.3 140	1.2 163	1.1 184								
320		3.1 52	2 89	1.6 119	1.3 145	1.2 168	1.1 190								
330		3.1 54	2 91	1.6 122	1.3 149	1.2 174	1.1 196								
340		3.1 55	2 94	1.6 126	1.3 154	1.2 179	1.1 202								
350		3.1 57	2 97	1.6 130	1.3 158	1.2 184	1.1 208								
360		3.1 59	2 100	1.6 134	1.3 163	1.2 189	1.1 214								
370		3.1 60	2 103	1.6 137	1.3 167	1.2 195									
380		3.1 62	2 105	1.6 141	1.3 172	1.2 200									
390		3.1 64	2 108	1.6 145	1.3 176	1.2 205									
400	6.1 30	3.1 65	2 111	1.6 148	1.3 181	1.2 210									
410	6.1 31	3.1 67	2 114	1.6 152	1.3 185	1.2 216									
420	6.1 32	3.1 69	2 116	1.6 156	1.3 190	1.2 221									
430	6 33	3.1 70	2 119	1.6 159	1.3 194	1.2 226									
440	6 33	3.1 72	2 122	1.6 163	1.3 199	1.2 231									
450	6 34	3.1 73	2 125	1.6 167	1.3 203	1.2 237									
460	6 35	3.1 75	2 127	1.6 171	1.3 208										
470	6 35	3.1 77	2 130	1.6 174	1.3 213										
480	6 36	3.1 78	2 133	1.6 178	1.3 217										
490	6 37	3.1 80	2 136	1.6 182	1.3 222										
500	6 38	3.1 82	2 139	1.6 185	1.3 226										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.5

Allowable Soil Stress = 0.07

C-D Design

Q	S = 0.1%		S = 0.25%		S = 0.5%		S = 0.75%		S = 1%		S = 1.25%		S = 1.5%		S = 1.75%		S = 2%		S = 3%		S = 4%		S = 5%		S = 6%		S = 8%		S = 10%	
	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)	D(ft)	T(ft)
10											1.4	8	1.3	9	1.1	10	1.1	10	0.9	7	0.7	8	0.7	9	0.6	11	0.5	13	0.5	14
20																			0.9	14	0.7	16	0.7	19	0.6	21	0.5	25	0.5	29
30																			0.8	20	0.7	25	0.7	28	0.6	32	0.5	38	0.5	43
40							1.9	11	1.6	13	1.4	15	1.2	17	1.1	19	1	21	0.8	27	0.7	33	0.7	38	0.6	42	0.5	50	0.5	57
50							1.9	13	1.5	16	1.4	19	1.2	21	1.1	24	1	26	0.8	34	0.7	41	0.7	47	0.6	53	0.5	63	0.5	71
60							1.8	16	1.5	19	1.4	23	1.2	26	1.1	29	1	31	0.8	41	0.7	49	0.7	56	0.6	63	0.5	75	0.5	86
70			2.4	14			1.8	18	1.5	23	1.4	26	1.2	30	1.1	33	1	37	0.8	48	0.7	57	0.7	66	0.6	74	0.5	88		
80			2.4	16			1.8	21	1.5	26	1.3	30	1.2	34	1.1	38	1	42	0.8	54	0.7	65	0.7	75	0.6	84	0.5	100		
90			2.4	17			1.8	24	1.5	29	1.3	34	1.2	39	1.1	43	1	47	0.8	61	0.7	74	0.7	85	0.6	95				
100			2.4	19			1.8	26	1.5	32	1.3	38	1.2	43	1.1	48	1	52	0.8	68	0.7	82	0.7	94	0.6	105				
110			2.4	21			1.8	29	1.5	36	1.3	42	1.2	47	1.1	52	1	57	0.8	75	0.7	90	0.7	103	0.6	116				
120			2.3	23			1.8	32	1.5	39	1.3	45	1.2	52	1.1	57	1	63	0.8	82	0.7	98	0.7	113						
130			2.3	25			1.8	34	1.5	42	1.3	49	1.2	56	1.1	62	1	68	0.8	88	0.7	106	0.7	122						
140			2.3	27			1.8	37	1.5	45	1.3	53	1.2	60	1.1	67	1	73	0.8	95	0.7	114	0.7	132						
150			2.3	29			1.8	39	1.5	49	1.3	57	1.2	64	1.1	72	1	78	0.8	102	0.7	123								
160			2.3	31			1.8	42	1.5	52	1.3	61	1.2	69	1.1	76	1	84	0.8	109	0.7	131								
170			2.3	33			1.8	45	1.5	55	1.3	64	1.2	73	1.1	81	1	89	0.8	116	0.7	139								
180		3.8	20	2.3	35		1.8	47	1.5	58	1.3	68	1.2	77	1.1	86	1	94	0.8	122										
190		3.8	21	2.3	37		1.8	50	1.5	61	1.3	72	1.2	82	1.1	91	1	99	0.8	129										
200		3.8	22	2.3	39		1.8	52	1.5	65	1.3	76	1.2	86	1.1	95	1	104	0.8	136										
210		3.8	23	2.3	40		1.8	55	1.5	68	1.3	79	1.2	90	1.1	100	1	110	0.8	143										
220		3.8	24	2.3	42		1.8	58	1.5	71	1.3	83	1.2	95	1.1	105	1	115	0.8	150										
230		3.8	25	2.3	44		1.8	60	1.5	74	1.3	87	1.2	99	1.1	110	1	120	0.8	157										
240		3.8	27	2.3	46		1.8	63	1.5	78	1.3	91	1.2	103	1.1	115	1	125	0.8	163										
250		3.8	28	2.3	48		1.8	66	1.5	81	1.3	95	1.2	107	1.1	119	1	130												
260		3.7	29	2.3	50		1.8	68	1.5	84	1.3	98	1.2	112	1.1	124	1	136												
270		3.7	30	2.3	52		1.8	71	1.5	87	1.3	102	1.2	116	1.1	129	1	141												
280		3.7	31	2.3	54		1.8	73	1.5	91	1.3	106	1.2	120	1.1	134	1	146												
290		3.7	32	2.3	56		1.8	76	1.5	94	1.3	110	1.2	125	1.1	138	1	151												
300		3.7	33	2.3	58		1.8	79	1.5	97	1.3	114	1.2	129	1.1	143	1	157												
310		3.7	34	2.3	60		1.8	81	1.5	100	1.3	117	1.2	133	1.1	148	1	162												
320		3.7	35	2.3	62		1.8	84	1.5	104	1.3	121	1.2	137	1.1	153	1	167												
330		3.7	36	2.3	64		1.8	86	1.5	107	1.3	125	1.2	142	1.1	157	1	172												
340		3.7	37	2.3	65		1.8	89	1.5	110	1.3	129	1.2	146	1.1	162	1	177												
350		3.7	38	2.3	67		1.8	92	1.5	113	1.3	132	1.2	150	1.1	167	1	183												
360		3.7	39	2.3	69		1.8	94	1.5	116	1.3	136	1.2	155	1.1	172	1	188												
370		3.7	41	2.3	71		1.8	97	1.5	120	1.3	140	1.2	159	1.1	177	1	193												
380		3.7	42	2.3	73		1.8	100	1.5	123	1.3	144	1.2	163	1.1	181	1	198												
390		3.7	43	2.3	75		1.8	102	1.5	126	1.3	148	1.2	168	1.1	186	1	204												
400		3.7	44	2.3	77		1.8	105	1.5	129	1.3	151	1.2	172	1.1	191														
410		3.7	45	2.3	79		1.8	107	1.5	133	1.3	155	1.2	176	1.1	196														
420		3.7	46	2.3	81		1.8	110	1.5	136	1.3	159	1.2	180	1.1	200														
430		3.7	47	2.3	83		1.8	113	1.5	139	1.3	163	1.2	185	1.1	205														
440		3.7	48	2.3	85		1.8	115	1.5	142	1.3	166	1.2	189	1.1	210														
450		3.7	49	2.3	87		1.8	118	1.5	146	1.3	170	1.2	193	1.1	215														
460		3.7	50	2.3	89		1.8	121	1.5	149	1.3	174	1.2	198	1.1	219														
470		3.7	51	2.3	90		1.8	123	1.5	152	1.3	178	1.2	202																
480		3.7	53	2.3	92		1.8	126	1.5	155	1.3	182	1.2	206																
490		3.7	54	2.3	94		1.8	128	1.5	158	1.3	185	1.2	210																
500		3.7	55	2.3	96		1.8	131	1.5	162	1.3	189	1.2	215																

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1%	S = 0.25%	S = 0.5%	S = 0.75%	S = 1%	S = 1.25%	S = 1.5%	S = 1.75%	S = 2%	S = 3%	S = 4%	S = 5%	S = 6%	S = 8%	S = 10%
	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)	D(ft) T(ft)
10				1.5 9	1.3 11	1.1 13	1 15	1 8	0.9 9	0.7 11	0.6 13	0.6 15	0.5 17	0.5 20	0.4 23
20															
30				1.9 10	1.5 14	1.3 17	1.1 19	1 22	0.9 24	0.7 26	0.6 27	0.6 30	0.5 34	0.5 40	0.4 45
40				1.9 14	1.5 18	1.3 22	1.1 26	1 29	0.9 32	0.7 34	0.6 40	0.6 46	0.5 51	0.5 60	0.4 68
50				1.9 17	1.5 23	1.3 28	1.1 32	1 36	0.9 40	0.7 45	0.6 53	0.6 61	0.5 68	0.5 80	
60				1.8 21	1.5 28	1.3 34	1.1 39	1 44	0.9 48	0.7 56	0.6 67	0.6 76	0.5 84		
70		2.9 15	1.8 24	1.5 32	1.3 39	1.1 45	1 51	0.9 56	0.7 67	0.6 80	0.6 91	0.5 101			
80		2.9 17	1.8 28	1.5 37	1.3 45	1.1 52	1 58	0.9 64	0.7 79	0.6 107					
90		2.8 19	1.8 31	1.5 42	1.3 50	1.1 58	1 66	0.9 72	0.7 101	0.6 120					
100		2.8 21	1.8 35	1.5 46	1.3 56	1.1 65	1 73	0.9 81	0.7 112						
110		2.8 23	1.8 38	1.5 51	1.3 62	1.1 71	1 80	0.9 89	0.7 123						
120		2.8 25	1.8 42	1.5 55	1.3 67	1.1 78	1 88	0.9 97	0.7 135						
130		2.8 27	1.8 45	1.5 60	1.3 73	1.1 84	1 95	0.9 105	0.7 146						
140		2.8 29	1.8 49	1.5 65	1.3 78	1.1 91	1 102	0.9 113	0.9 122						
150		2.8 31	1.8 52	1.5 69	1.3 84	1.1 97	1 109	0.9 121	0.9 131						
160		2.8 34	1.8 56	1.5 74	1.3 90	1.1 104	1 117	0.9 129	0.9 140						
170		2.8 36	1.8 59	1.5 79	1.3 95	1.1 110	1 124	0.9 137	0.9 149						
180		2.8 38	1.8 63	1.5 83	1.3 101	1.1 117	1 131	0.9 145	0.9 157						
190		2.8 40	1.8 66	1.5 88	1.3 106	1.1 123	1 139	0.9 153	0.9 166						
200		2.8 42	1.8 70	1.5 92	1.3 112	1.1 130	1 146	0.9 161	0.9 175						
210		2.8 44	1.8 73	1.5 97	1.3 118	1.1 136	1 153	0.9 169							
220		2.8 46	1.8 77	1.5 102	1.3 123	1.1 143	1 161	0.9 177							
230		2.8 48	1.8 80	1.5 106	1.3 129	1.1 149	1 168	0.9 185							
240		2.8 50	1.8 84	1.5 111	1.3 134	1.1 156	1 175								
250		2.8 52	1.8 87	1.5 115	1.3 140	1.1 162	1 182								
260		2.8 54	1.8 91	1.5 120	1.3 146	1.1 169	1 190								
270	5.3 27	2.8 56	1.8 94	1.5 125	1.3 151	1.1 175	1 197								
280	5.3 28	2.8 59	1.8 98	1.5 129	1.3 157	1.1 182									
290	5.3 29	2.8 61	1.8 101	1.5 134	1.3 162	1.1 188									
300	5.2 30	2.8 63	1.8 105	1.5 139	1.3 168	1.1 195									
310	5.2 31	2.8 65	1.8 108	1.5 143	1.3 174	1.1 201									
320	5.2 32	2.8 67	1.8 112	1.5 148	1.3 179	1.1 208									
330	5.2 33	2.8 69	1.8 115	1.5 152	1.3 185	1.1 214									
340	5.2 34	2.8 71	1.8 119	1.5 157	1.3 190	1.1 221									
350	5.2 35	2.8 73	1.8 122	1.5 162	1.3 196										
360	5.2 36	2.8 75	1.8 125	1.5 166	1.3 202										
370	5.2 37	2.8 77	1.8 129	1.5 171	1.3 207										
380	5.2 38	2.8 80	1.8 132	1.5 176	1.3 213										
390	5.2 39	2.8 82	1.8 136	1.5 180	1.3 218										
400	5.2 40	2.8 84	1.8 139	1.5 185	1.3 224										
410	5.2 41	2.8 86	1.8 143	1.5 189	1.3 230										
420	5.2 42	2.8 88	1.8 146	1.5 194	1.3 235										
430	5.2 43	2.8 90	1.8 150	1.5 199	1.3 241										
440	5.2 44	2.8 92	1.8 153	1.5 203	1.3 246										
450	5.2 45	2.8 94	1.8 157	1.5 208											
460	5.2 46	2.8 96	1.8 160	1.5 212											
470	5.2 47	2.8 98	1.8 164	1.5 217											
480	5.1 48	2.8 100	1.8 167	1.5 222											
490	5.1 49	2.8 103	1.8 171	1.5 226											
500	5.1 50	2.8 105	1.8 174	1.5 231											

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10						1.3 9	1.2 10	1.1 11	1 6	0.8 8	0.7 9	0.6 11	0.6 12	0.5 14	0.5 16
20						1.3 18	1.2 20	1.1 22	1 12	0.8 16	0.7 19	0.6 22	0.6 24	0.5 28	0.5 32
30				1.8 9	1.5 11	1.3 13	1.2 15	1.1 17	1 18	0.8 24	0.7 28	0.6 32	0.6 36	0.5 43	0.5 49
40				1.7 12	1.5 15	1.3 18	1.2 20	1.1 22	1 24	0.8 31	0.7 38	0.6 43	0.6 48	0.5 57	0.5 65
50			2.3 12	1.7 15	1.5 19	1.3 22	1.2 25	1.1 28	1 30	0.8 39	0.7 47	0.6 54	0.6 60	0.5 71	0.5 81
60			2.2 14	1.7 19	1.4 23	1.3 26	1.2 30	1.1 33	1 36	0.8 47	0.7 56	0.6 65	0.6 72	0.5 85	
70			2.2 16	1.7 22	1.4 26	1.3 31	1.2 35	1.1 39	1 42	0.8 55	0.7 66	0.6 75	0.6 84	0.5 100	
80			2.2 18	1.7 25	1.4 30	1.3 35	1.2 40	1.1 44	1 48	0.8 63	0.7 75	0.6 86	0.6 96		
90			2.2 21	1.7 28	1.4 34	1.3 40	1.2 45	1.1 50	1 54	0.8 71	0.7 84	0.6 97	0.6 108		
100			2.2 23	1.7 31	1.4 38	1.3 44	1.2 50	1.1 55	1 60	0.8 78	0.7 94	0.6 108			
110			2.2 25	1.7 34	1.4 42	1.3 49	1.2 55	1.1 61	1 66	0.8 86	0.7 103	0.6 118			
120			2.2 27	1.7 37	1.4 45	1.3 53	1.2 60	1.1 66	1 72	0.8 94	0.7 113				
130			2.2 30	1.7 40	1.4 49	1.3 57	1.2 65	1.1 72	1 79	0.8 102	0.7 122				
140	3.5 19	2.2 32	1.7 43	1.4 53	1.3 62	1.2 70	1.1 77	1 85	0.8 110	0.7 131					
150	3.5 20	2.2 34	1.7 46	1.4 57	1.3 66	1.2 75	1.1 83	1 91	0.8 118	0.7 141					
160	3.5 21	2.2 37	1.7 49	1.4 60	1.3 71	1.2 80	1.1 88	1 97	0.8 126						
170	3.5 23	2.2 39	1.7 52	1.4 64	1.3 75	1.2 85	1.1 94	1 103	0.8 133						
180	3.5 24	2.2 41	1.7 55	1.4 68	1.3 79	1.2 90	1.1 100	1 109	0.8 141						
190	3.4 25	2.2 43	1.7 58	1.4 72	1.3 84	1.2 95	1.1 105	1 115	0.8 149						
200	3.4 27	2.2 46	1.7 62	1.4 76	1.3 88	1.2 100	1.1 111	1 121	0.8 157						
210	3.4 28	2.2 48	1.7 65	1.4 79	1.3 93	1.2 105	1.1 116	1 127							
220	3.4 29	2.2 50	1.7 68	1.4 83	1.3 97	1.2 110	1.1 122	1 133							
230	3.4 30	2.2 52	1.7 71	1.4 87	1.3 101	1.2 115	1.1 127	1 139							
240	3.4 32	2.2 55	1.7 74	1.4 91	1.3 106	1.2 120	1.1 133	1 145							
250	3.4 33	2.2 57	1.7 77	1.4 94	1.3 110	1.2 125	1.1 138	1 151							
260	3.4 34	2.2 59	1.7 80	1.4 98	1.3 115	1.2 130	1.1 144	1 157							
270	3.4 36	2.2 62	1.7 83	1.4 102	1.3 119	1.2 135	1.1 149	1 163							
280	3.4 37	2.2 64	1.7 86	1.4 106	1.3 124	1.2 140	1.1 155	1 169							
290	3.4 38	2.2 66	1.7 89	1.4 109	1.3 128	1.2 145	1.1 160	1 175							
300	3.4 40	2.2 68	1.7 92	1.4 113	1.3 132	1.2 150	1.1 166	1 181							
310	3.4 41	2.2 71	1.7 95	1.4 117	1.3 137	1.2 155	1.1 171	1 187							
320	3.4 42	2.2 73	1.7 98	1.4 121	1.3 141	1.2 160	1.1 177	1 193							
330	3.4 44	2.2 75	1.7 102	1.4 125	1.3 146	1.2 165	1.1 182								
340	3.4 45	2.2 78	1.7 105	1.4 128	1.3 150	1.2 170	1.1 188								
350	3.4 46	2.2 80	1.7 108	1.4 132	1.3 154	1.2 175	1.1 194								
360	3.4 47	2.2 82	1.7 111	1.4 136	1.3 159	1.2 180	1.1 199								
370	3.4 49	2.2 84	1.7 114	1.4 140	1.3 163	1.2 185	1.1 205								
380	3.4 50	2.2 87	1.7 117	1.4 143	1.3 168	1.2 190	1.1 210								
390	3.4 51	2.2 89	1.7 120	1.4 147	1.3 172	1.2 195									
400	3.4 53	2.2 91	1.7 123	1.4 151	1.3 176	1.2 200									
410	3.4 54	2.2 94	1.7 126	1.4 155	1.3 181	1.2 205									
420	3.4 55	2.2 96	1.7 129	1.4 159	1.3 185	1.2 210									
430	3.4 57	2.2 98	1.7 132	1.4 162	1.3 190	1.2 215									
440	3.4 58	2.2 100	1.7 136	1.4 166	1.3 194	1.2 220									
450	3.4 59	2.2 103	1.7 139	1.4 170	1.3 199	1.2 225									
460	3.4 61	2.2 105	1.7 142	1.4 174	1.3 203	1.2 230									
470	3.4 62	2.2 107	1.7 145	1.4 177	1.3 207										
480	3.4 63	2.2 109	1.7 148	1.4 181	1.3 212										
490	3.4 65	2.2 112	1.7 151	1.4 185	1.3 216										
500	3.4 66	2.2 114	1.7 154	1.4 189	1.3 221										

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10									1.2 7	1 10	0.8 6	0.7 7	0.7 8	0.6 9	0.5 11
20											0.8 12	0.7 14	0.7 15	0.6 18	0.5 21
30							1.4 9	1.3 10	1.2 11	1 15	0.8 18	0.7 20	0.7 23	0.6 28	0.5 32
40						1.6 11	1.4 12	1.3 13	1.2 15	0.9 19	0.8 24	0.7 27	0.7 31	0.6 37	0.5 42
50					1.8 11	1.6 13	1.4 15	1.3 17	1.2 18	0.9 24	0.8 30	0.7 34	0.7 38	0.6 46	0.5 53
60					1.8 13	1.6 16	1.4 18	1.3 20	1.2 22	0.9 29	0.8 35	0.7 41	0.7 46	0.6 55	0.5 63
70				2.2 13	1.8 16	1.6 18	1.4 21	1.3 23	1.2 26	0.9 34	0.8 41	0.7 48	0.7 54	0.6 64	0.5 74
80					1.8 18	1.6 21	1.4 24	1.3 27	1.2 29	0.9 39	0.8 47	0.7 55	0.7 61	0.6 73	0.5 84
90				2.2 14	1.8 20	1.6 24	1.4 27	1.3 30	1.2 33	0.9 44	0.8 53	0.7 61	0.7 69	0.6 83	0.5 95
100				2.2 16	1.8 22	1.6 26	1.4 30	1.3 34	1.2 37	0.9 49	0.8 59	0.7 68	0.7 77	0.6 92	
110				2.2 18	1.8 24	1.6 29	1.4 33	1.3 37	1.2 41	0.9 54	0.8 65	0.7 75	0.7 84	0.6 101	
120		2.9 16	2.2 21	1.8 27	1.6 32	1.4 36	1.3 40	1.2 44	0.9 58	0.8 71	0.7 82	0.7 92	0.6 110		
130		2.9 17	2.1 23	1.8 29	1.6 34	1.4 39	1.3 44	1.2 48	0.9 63	0.8 77	0.7 89	0.7 100			
140		2.9 18	2.1 25	1.8 31	1.6 37	1.4 42	1.3 47	1.2 52	0.9 68	0.8 83	0.7 95	0.7 107			
150		2.8 19	2.1 27	1.8 33	1.6 39	1.4 45	1.3 50	1.2 55	0.9 73	0.8 89	0.7 102	0.7 115			
160		2.8 21	2.1 28	1.8 36	1.6 42	1.4 48	1.3 54	1.2 59	0.9 78	0.8 94	0.7 109	0.7 123			
170		2.8 22	2.1 30	1.8 38	1.5 45	1.4 51	1.3 57	1.2 63	0.9 83	0.8 100	0.7 116	0.7 130			
180		2.8 23	2.1 32	1.8 40	1.5 47	1.4 54	1.3 60	1.2 66	0.9 88	0.8 106	0.7 123				
190		2.8 24	2.1 34	1.8 42	1.5 50	1.4 57	1.3 64	1.2 70	0.9 93	0.8 112	0.7 129				
200		2.8 26	2.1 36	1.8 44	1.5 52	1.4 60	1.3 67	1.2 74	0.9 97	0.8 118	0.7 136				
210		2.8 27	2.1 37	1.8 47	1.5 55	1.4 63	1.3 70	1.2 77	0.9 102	0.8 124	0.7 143				
220		2.8 28	2.1 39	1.8 49	1.5 58	1.4 66	1.3 74	1.2 81	0.9 107	0.8 130					
230		2.8 30	2.1 41	1.8 51	1.5 60	1.4 69	1.3 77	1.2 85	0.9 112	0.8 136					
240		2.8 31	2.1 43	1.8 53	1.5 63	1.4 72	1.3 80	1.2 88	0.9 117	0.8 142					
250		2.8 32	2.1 44	1.8 55	1.5 66	1.4 75	1.3 84	1.2 92	0.9 122	0.8 148					
260		2.8 33	2.1 46	1.8 58	1.5 68	1.4 78	1.3 87	1.2 96	0.9 127	0.8 153					
270		2.8 35	2.1 48	1.8 60	1.5 71	1.4 81	1.3 91	1.2 99	0.9 131	0.8 159					
280		2.8 36	2.1 50	1.8 62	1.5 73	1.4 84	1.3 94	1.2 103	0.9 136						
290		2.8 37	2.1 51	1.8 64	1.5 76	1.4 87	1.3 97	1.2 107	0.9 141						
300		2.8 38	2.1 53	1.8 67	1.5 79	1.4 90	1.3 101	1.2 110	0.9 146						
310		2.8 40	2.1 55	1.8 69	1.5 81	1.4 93	1.3 104	1.2 114	0.9 151						
320		2.8 41	2.1 57	1.8 71	1.5 84	1.4 96	1.3 107	1.2 118	0.9 156						
330		2.8 42	2.1 59	1.8 73	1.5 87	1.4 99	1.3 111	1.2 122	0.9 161						
340	4.8 24	2.8 43	2.1 60	1.8 75	1.5 89	1.4 102	1.3 114	1.2 125	0.9 166						
350	4.8 25	2.8 45	2.1 62	1.8 78	1.5 92	1.4 105	1.3 117	1.2 129	0.9 170						
360	4.8 25	2.8 46	2.1 64	1.8 80	1.5 94	1.4 108	1.3 121	1.2 133	0.9 175						
370	4.7 26	2.8 47	2.1 66	1.8 82	1.5 97	1.4 111	1.3 124	1.2 136	0.9 180						
380	4.7 27	2.8 49	2.1 67	1.8 84	1.5 100	1.4 114	1.3 127	1.2 140	0.9 185						
390	4.7 28	2.8 50	2.1 69	1.8 87	1.5 102	1.4 117	1.3 131	1.2 144							
400	4.7 28	2.8 51	2.1 71	1.8 89	1.5 105	1.4 120	1.3 134	1.2 147							
410	4.7 29	2.8 52	2.1 73	1.8 91	1.5 108	1.4 123	1.3 137	1.2 151							
420	4.7 30	2.8 54	2.1 75	1.8 93	1.5 110	1.4 126	1.3 141	1.2 155							
430	4.7 30	2.8 55	2.1 76	1.8 95	1.5 113	1.4 129	1.3 144	1.2 158							
440	4.7 31	2.8 56	2.1 78	1.8 98	1.5 115	1.4 132	1.3 148	1.2 162							
450	4.7 32	2.8 58	2.1 80	1.8 100	1.5 118	1.4 135	1.3 151	1.2 166							
460	4.7 32	2.8 59	2.1 82	1.8 102	1.5 121	1.4 138	1.3 154	1.2 169							
470	4.7 33	2.8 60	2.1 83	1.8 104	1.5 123	1.4 141	1.3 158	1.2 173							
480	4.7 34	2.8 61	2.1 85	1.8 107	1.5 126	1.4 144	1.3 161	1.2 177							
490	4.7 34	2.8 63	2.1 87	1.8 109	1.5 129	1.4 147	1.3 164	1.2 180							
500	4.7 35	2.8 64	2.1 89	1.8 111	1.5 131	1.4 150	1.3 168	1.2 184							

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.75

Allowable Soil Stress = 0.07

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10										1.1 7	0.9 9	0.8 5	0.8 6	0.6 7	0.6 8
20										1.1 10	0.9 13	0.8 10	0.7 11	0.6 14	0.6 16
30									1.4 8	1.1 14	0.9 17	0.8 15	0.7 17	0.6 20	0.6 23
40							1.7 8	1.5 9	1.4 10	1.1 17	0.9 21	0.8 20	0.7 22	0.6 27	0.6 31
50							1.7 11	1.5 12	1.4 13	1.1 21	0.9 26	0.8 25	0.7 28	0.6 34	0.6 39
60						1.9 11	1.6 13	1.5 14	1.4 16	1.1 24	0.9 30	0.8 30	0.7 34	0.6 41	0.6 47
70						1.8 13	1.6 15	1.5 17	1.4 18	1.1 28	0.9 34	0.8 35	0.7 39	0.6 47	0.6 55
80					2.2 12	1.8 15	1.6 17	1.5 19	1.4 21	1.1 31	0.9 38	0.8 40	0.7 45	0.6 54	0.6 63
90					2.1 14	1.8 16	1.6 19	1.5 21	1.4 23	1.1 35	0.9 43	0.8 45	0.7 51	0.6 61	0.6 70
100					2.1 15	1.8 18	1.6 21	1.5 24	1.4 26	1.1 38	0.9 47	0.8 50	0.7 56	0.6 68	0.6 78
110				2.6 13	2.1 17	1.8 20	1.6 23	1.5 26	1.4 29	1.1 42	0.9 51	0.8 55	0.7 62	0.6 74	0.6 86
120				2.6 15	2.1 18	1.8 22	1.6 25	1.5 28	1.4 31	1.1 45	0.9 55	0.8 60	0.7 67	0.6 81	0.6 94
130				2.6 16	2.1 20	1.8 24	1.6 27	1.5 31	1.4 34	1.1 49	0.9 60	0.8 65	0.7 73	0.6 88	0.6 102
140				2.6 17	2.1 21	1.8 26	1.6 29	1.5 33	1.4 36	1.1 52	0.9 64	0.8 70	0.7 79	0.6 95	0.6 109
150				2.6 18	2.1 23	1.8 27	1.6 31	1.5 35	1.4 39	1.1 56	0.9 68	0.8 75	0.7 84	0.6 102	
160				2.6 19	2.1 24	1.8 29	1.6 34	1.5 38	1.4 42	1.1 59	0.9 73	0.8 80	0.7 90	0.6 108	
170				2.6 21	2.1 26	1.8 31	1.6 36	1.5 40	1.4 44	1.1 63	0.9 77	0.8 84	0.7 95	0.6 115	
180				2.6 22	2.1 27	1.8 33	1.6 38	1.5 42	1.3 47	1.1 66	0.9 81	0.8 89	0.7 101	0.6 122	
190				2.6 23	2.1 29	1.8 35	1.6 40	1.5 45	1.3 49	1.1 70	0.9 85	0.8 94	0.7 107		
200				2.6 24	2.1 31	1.8 36	1.6 42	1.5 47	1.3 52	1.1 73	0.9 88	0.8 99	0.7 112		
210			3.5 18	2.6 25	2.1 32	1.8 38	1.6 44	1.5 50	1.3 55	1.1 77	0.9 90	0.8 104	0.7 118		
220			3.5 19	2.6 26	2.1 34	1.8 40	1.6 46	1.5 52	1.3 57	1.1 80	0.9 94	0.8 109	0.7 123		
230			3.5 20	2.6 28	2.1 35	1.8 42	1.6 48	1.5 54	1.3 60	1.1 84	0.9 98	0.8 114	0.7 129		
240			3.5 21	2.6 29	2.1 37	1.8 44	1.6 50	1.5 57	1.3 62	1.1 87	0.9 103	0.8 119	0.7 135		
250			3.5 21	2.6 30	2.1 38	1.8 45	1.6 52	1.5 59	1.3 65	1.1 91	0.9 107	0.8 124	0.7 140		
260			3.5 22	2.6 31	2.1 40	1.8 47	1.6 54	1.5 61	1.3 68	1.1 94	0.9 111	0.8 129	0.7 146		
270			3.5 23	2.6 32	2.1 41	1.8 49	1.6 57	1.5 64	1.3 70	1.1 98	0.9 115	0.8 134			
280			3.5 24	2.6 34	2.1 43	1.8 51	1.6 59	1.5 66	1.3 73	1.1 101	0.9 120	0.8 139			
290			3.5 25	2.6 35	2.1 44	1.8 53	1.6 61	1.5 68	1.3 75	1.1 105	0.9 124	0.8 144			
300			3.5 26	2.5 36	2.1 46	1.8 55	1.6 63	1.5 71	1.3 78	1.1 108	0.9 128	0.8 149			
310			3.5 26	2.5 37	2.1 47	1.8 56	1.6 65	1.5 73	1.3 81	1.1 112	0.9 132	0.8 154			
320			3.5 27	2.5 38	2.1 49	1.8 58	1.6 67	1.5 75	1.3 83	1.1 115	0.9 137	0.8 159			
330			3.4 28	2.5 40	2.1 50	1.8 60	1.6 69	1.5 78	1.3 86	1.1 119	0.9 141				
340			3.4 29	2.5 41	2.1 52	1.8 62	1.6 71	1.5 80	1.3 88	1.1 122	0.9 145				
350			3.4 30	2.5 42	2.1 53	1.8 64	1.6 73	1.5 83	1.3 91	1.1 126	0.9 150				
360			3.4 31	2.5 43	2.1 55	1.8 65	1.6 75	1.5 85	1.3 94	1.1 129	0.9 154				
370			3.4 31	2.5 44	2.1 56	1.8 67	1.6 77	1.5 87	1.3 96	1.1 133	0.9 158				
380			3.4 32	2.5 46	2.1 58	1.8 69	1.6 80	1.5 90	1.3 99	1.1 136	0.9 162				
390			3.4 33	2.5 47	2.1 59	1.8 71	1.6 82	1.5 92	1.3 101	1.1 140	0.9 167				
400			3.4 34	2.5 48	2.1 61	1.8 73	1.6 84	1.5 94	1.3 104	1.1 143	0.9 171				
410			3.4 35	2.5 49	2.1 62	1.8 75	1.6 86	1.5 97	1.3 107	1.1 147	0.9 175				
420			3.4 36	2.5 50	2.1 64	1.8 76	1.6 88	1.5 99	1.3 109	1.1 150	0.9 179				
430			3.4 36	2.5 52	2.1 65	1.8 78	1.6 90	1.5 101	1.3 112	1.1 154					
440			3.4 37	2.5 53	2.1 67	1.8 80	1.6 92	1.5 104	1.3 114	1.1 157					
450			3.4 38	2.5 54	2.1 68	1.8 82	1.6 94	1.5 106	1.3 117	1.1 161					
460			3.4 39	2.5 55	2.1 70	1.8 84	1.6 96	1.5 108	1.3 120	1.1 164					
470			3.4 40	2.5 56	2.1 72	1.8 85	1.6 98	1.5 111	1.3 122	1.1 168					
480			3.4 40	2.5 58	2.1 73	1.8 87	1.6 101	1.5 113	1.3 125	1.1 171					
490			3.4 41	2.5 59	2.1 75	1.8 89	1.6 103	1.5 116	1.3 127	1.1 175					
500			3.4 42	2.5 60	2.1 76	1.8 91	1.6 105	1.5 118	1.3 130						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10							1.3 8	1.2 9	1.1 10	0.9 6	0.8 8	0.7 9	0.6 10	0.5 12	0.5 13
20							1.3 12	1.2 13	1.1 14	0.9 12	0.8 15	0.7 17	0.6 19	0.5 23	0.5 26
30					1.7 9	1.4 10	1.3 16	1.2 17	1.1 19	0.9 19	0.8 23	0.7 26	0.6 29	0.5 35	0.5 40
40					1.6 12	1.4 14	1.3 20	1.2 22	1.1 24	0.9 25	0.8 30	0.7 35	0.6 39	0.5 46	0.5 53
50				1.9 12	1.6 15	1.4 17	1.3 27	1.2 30	1.1 33	0.9 31	0.8 38	0.7 43	0.6 48	0.5 58	0.5 66
60				1.9 14	1.6 18	1.4 21	1.3 23	1.2 26	1.1 29	0.9 37	0.8 45	0.7 52	0.6 58	0.5 69	0.5 79
70				1.9 17	1.6 21	1.4 24	1.3 27	1.2 30	1.1 33	0.9 44	0.8 53	0.7 61	0.6 68	0.5 81	0.5 92
80			2.5 14	1.9 19	1.6 23	1.4 28	1.3 31	1.2 35	1.1 38	0.9 50	0.8 60	0.7 69	0.6 78	0.5 92	
90			2.5 16	1.9 21	1.6 26	1.4 31	1.3 35	1.2 39	1.1 43	0.9 56	0.8 68	0.7 78	0.6 87	0.5 104	
100			2.5 17	1.9 24	1.6 29	1.4 34	1.3 39	1.2 44	1.1 48	0.9 62	0.8 75	0.7 86	0.6 97		
110			2.5 19	1.9 26	1.6 32	1.4 38	1.3 43	1.2 48	1.1 52	0.9 69	0.8 83	0.7 95	0.6 107		
120			2.5 21	1.9 28	1.6 35	1.4 41	1.3 47	1.2 52	1.1 57	0.9 75	0.8 90	0.7 104	0.6 116		
130			2.5 23	1.9 31	1.6 38	1.4 45	1.3 51	1.2 57	1.1 62	0.9 81	0.8 98	0.7 112			
140			2.5 24	1.9 33	1.6 41	1.4 48	1.3 55	1.2 61	1.1 67	0.9 87	0.8 105	0.7 121			
150			2.4 26	1.9 36	1.6 44	1.4 52	1.3 59	1.2 65	1.1 72	0.9 94	0.8 113	0.7 130			
160			2.4 28	1.9 38	1.6 47	1.4 55	1.3 63	1.2 70	1.1 76	0.9 100	0.8 120				
170			2.4 30	1.9 40	1.6 50	1.4 59	1.3 67	1.2 74	1.1 81	0.9 106	0.8 128				
180			2.4 31	1.9 43	1.6 53	1.4 62	1.3 70	1.2 78	1.1 86	0.9 112	0.8 135				
190			2.4 33	1.9 45	1.6 56	1.4 65	1.3 74	1.2 83	1.1 91	0.9 119	0.8 143				
200			2.4 35	1.9 47	1.6 59	1.4 69	1.3 78	1.2 87	1.1 95	0.9 125	0.8 150				
210	4 21		2.4 36	1.9 50	1.6 62	1.4 72	1.3 82	1.2 91	1.1 100	0.9 131					
220	4 22		2.4 38	1.9 52	1.6 65	1.4 76	1.3 86	1.2 96	1.1 105	0.9 137					
230	4 23		2.4 40	1.9 55	1.6 68	1.4 79	1.3 90	1.2 100	1.1 110	0.9 143					
240	4 24		2.4 42	1.9 57	1.6 70	1.4 83	1.3 94	1.2 104	1.1 114	0.9 150					
250	4 25		2.4 43	1.9 59	1.6 73	1.4 86	1.3 98	1.2 109	1.1 119	0.9 156					
260	4 26		2.4 45	1.9 62	1.6 76	1.4 90	1.3 102	1.2 113	1.1 124	0.9 162					
270	4 27		2.4 47	1.9 64	1.6 79	1.4 93	1.3 106	1.2 118	1.1 129	0.9 168					
280	4 28		2.4 49	1.9 66	1.6 82	1.4 96	1.3 110	1.2 122	1.1 133						
290	4 29		2.4 50	1.9 69	1.6 85	1.4 100	1.3 113	1.2 126	1.1 138						
300	4 29		2.4 52	1.9 71	1.6 88	1.4 103	1.3 117	1.2 131	1.1 143						
310	4 30		2.4 54	1.9 73	1.6 91	1.4 107	1.3 121	1.2 135	1.1 148						
320	4 31		2.4 55	1.9 76	1.6 94	1.4 110	1.3 125	1.2 139	1.1 153						
330	4 32		2.4 57	1.9 78	1.6 97	1.4 114	1.3 129	1.2 144	1.1 157						
340	4 33		2.4 59	1.9 81	1.6 100	1.4 117	1.3 133	1.2 148	1.1 162						
350	4 34		2.4 61	1.9 83	1.6 103	1.4 121	1.3 137	1.2 152	1.1 167						
360	3.9 35		2.4 62	1.9 85	1.6 106	1.4 124	1.3 141	1.2 157	1.1 172						
370	3.9 36		2.4 64	1.9 88	1.6 109	1.4 127	1.3 145	1.2 161	1.1 176						
380	3.9 37		2.4 66	1.9 90	1.6 112	1.4 131	1.3 149	1.2 165	1.1 181						
390	3.9 38		2.4 68	1.9 92	1.6 114	1.4 134	1.3 153	1.2 170	1.1 186						
400	3.9 39		2.4 69	1.9 95	1.6 117	1.4 138	1.3 156	1.2 174	1.1 191						
410	3.9 40		2.4 71	1.9 97	1.6 120	1.4 141	1.3 160	1.2 178	1.1 195						
420	3.9 41		2.4 73	1.9 99	1.6 123	1.4 145	1.3 164	1.2 183	1.1 200						
430	3.9 42		2.4 74	1.9 102	1.6 126	1.4 148	1.3 168	1.2 187	1.1 205						
440	3.9 43		2.4 76	1.9 104	1.6 129	1.4 152	1.3 172	1.2 191	1.1 210						
450	3.9 44		2.4 78	1.9 107	1.6 132	1.4 155	1.3 176	1.2 196	1.1 215						
460	3.9 45		2.4 80	1.9 109	1.6 135	1.4 158	1.3 180	1.2 200							
470	3.9 46		2.4 81	1.9 111	1.6 138	1.4 162	1.3 184	1.2 205							
480	3.9 47		2.4 83	1.9 114	1.6 141	1.4 165	1.3 188	1.2 209							
490	3.9 48		2.4 85	1.9 116	1.6 144	1.4 169	1.3 192	1.2 213							
500	3.9 49		2.4 87	1.9 118	1.6 147	1.4 172	1.3 196	1.2 218							

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10											0.9 5	0.8 6	0.7 7	0.6 8	0.5 9
20										1 8	0.9 10	0.8 12	0.7 13	0.6 16	0.5 19
30										1 13	0.9 15	0.8 18	0.7 20	0.6 24	0.5 28
40						1.7 9	1.5 10	1.4 12	1.3 13	1 17	0.9 21	0.8 24	0.7 27	0.6 32	0.5 37
50							1.5 13	1.4 14	1.3 16	1 21	0.9 26	0.8 30	0.7 34	0.6 40	0.5 46
60					2 11	1.7 14	1.5 16	1.4 17	1.3 19	1 25	0.9 31	0.8 36	0.7 40	0.6 48	0.5 56
70					1.9 13	1.7 16	1.5 18	1.4 20	1.3 22	1 30	0.9 36	0.8 42	0.7 47	0.6 57	0.5 65
80				2.4 12	1.9 15	1.7 18	1.5 21	1.4 23	1.2 26	1 34	0.9 41	0.8 48	0.7 54	0.6 65	0.5 74
90				2.4 14	1.9 17	1.7 20	1.5 23	1.4 26	1.2 29	1 38	0.9 46	0.8 54	0.7 60	0.6 73	0.5 84
100				2.3 15	1.9 19	1.7 23	1.5 26	1.4 29	1.2 32	1 42	0.9 51	0.8 60	0.7 67	0.6 81	0.5 93
110				2.3 17	1.9 21	1.7 25	1.5 28	1.3 32	1.2 35	1 47	0.9 57	0.8 66	0.7 74	0.6 89	0.5 102
120				2.3 18	1.9 23	1.7 27	1.5 31	1.3 35	1.2 38	1 51	0.9 62	0.8 72	0.7 81	0.6 97	
130				2.3 20	1.9 25	1.7 29	1.5 34	1.3 38	1.2 41	1 55	0.9 67	0.8 78	0.7 87	0.6 105	
140				2.3 21	1.9 27	1.7 32	1.5 36	1.3 40	1.2 45	1 59	0.9 72	0.8 84	0.7 94	0.6 113	
150		3.1 16		2.3 23	1.9 29	1.7 34	1.5 39	1.3 43	1.2 48	1 64	0.9 77	0.8 89	0.7 101		
160		3.1 17		2.3 24	1.9 30	1.7 36	1.5 41	1.3 46	1.2 51	1 68	0.9 82	0.8 95	0.7 108		
170		3.1 19		2.3 26	1.9 32	1.7 38	1.5 44	1.3 49	1.2 54	1 72	0.9 88	0.8 101	0.7 114		
180		3.1 20		2.3 27	1.9 34	1.6 41	1.5 46	1.3 52	1.2 57	1 76	0.9 93	0.8 107	0.7 121		
190		3.1 21		2.3 29	1.9 36	1.6 43	1.5 49	1.3 55	1.2 60	1 81	0.9 98	0.8 113	0.7 128		
200		3.1 22		2.3 30	1.9 38	1.6 45	1.5 52	1.3 58	1.2 64	1 85	0.9 103	0.8 119	0.7 134		
210		3.1 23		2.3 32	1.9 40	1.6 47	1.5 54	1.3 61	1.2 67	1 89	0.9 108	0.8 125			
220		3.1 24		2.3 33	1.9 42	1.6 50	1.5 57	1.3 64	1.2 70	1 93	0.9 113	0.8 131			
230		3.1 25		2.3 35	1.9 44	1.6 52	1.5 59	1.3 66	1.2 73	1 97	0.9 118	0.8 137			
240		3.1 26		2.3 36	1.9 46	1.6 54	1.5 62	1.3 69	1.2 76	1 102	0.9 124	0.8 143			
250		3.1 27		2.3 38	1.9 47	1.6 56	1.5 65	1.3 72	1.2 80	1 106	0.9 129	0.8 149			
260		3.1 28		2.3 39	1.9 49	1.6 59	1.5 67	1.3 75	1.2 83	1 110	0.9 134				
270		3.1 29		2.3 41	1.9 51	1.6 61	1.5 70	1.3 78	1.2 86	1 114	0.9 139				
280		3.1 30		2.3 42	1.9 53	1.6 63	1.5 72	1.3 81	1.2 89	1 119	0.9 144				
290		3 31		2.3 44	1.9 55	1.6 65	1.5 75	1.3 84	1.2 92	1 123	0.9 149				
300		3 32		2.3 45	1.9 57	1.6 68	1.5 77	1.3 87	1.2 95	1 127	0.9 154				
310		3 33		2.3 47	1.9 59	1.6 70	1.5 80	1.3 90	1.2 99	1 131	0.9 160				
320		3 34		2.3 48	1.9 61	1.6 72	1.5 83	1.3 92	1.2 102	1 136	0.9 165				
330		3 36		2.3 50	1.9 63	1.6 74	1.5 85	1.3 95	1.2 105	1 140	0.9 170				
340		3 37		2.3 51	1.9 64	1.6 77	1.5 88	1.3 98	1.2 108	1 144					
350		3 38		2.3 53	1.9 66	1.6 79	1.5 90	1.3 101	1.2 111	1 148					
360		3 39		2.3 54	1.9 68	1.6 81	1.5 93	1.3 104	1.2 115	1 153					
370		3 40		2.3 56	1.9 70	1.6 83	1.5 95	1.3 107	1.2 118	1 157					
380		3 41		2.3 57	1.9 72	1.6 86	1.5 98	1.3 110	1.2 121	1 161					
390		3 42		2.3 59	1.9 74	1.6 88	1.5 101	1.3 113	1.2 124	1 165					
400		3 43		2.3 60	1.9 76	1.6 90	1.5 103	1.3 116	1.2 127	1 169					
410		3 44		2.3 62	1.9 78	1.6 92	1.5 106	1.3 118	1.2 130	1 174					
420		3 45		2.3 63	1.9 80	1.6 95	1.5 108	1.3 121	1.2 134	1 178					
430		3 46		2.3 65	1.9 82	1.6 97	1.5 111	1.3 124	1.2 137	1 182					
440		3 47		2.3 66	1.9 83	1.6 99	1.5 114	1.3 127	1.2 140	1 186					
450		3 48		2.3 68	1.9 85	1.6 101	1.5 116	1.3 130	1.2 143	1 191					
460	5.3 27	3 49		2.3 69	1.9 87	1.6 104	1.5 119	1.3 133	1.2 146	1 195					
470	5.3 27	3 50		2.3 71	1.9 89	1.6 106	1.5 121	1.3 136	1.2 150						
480	5.3 28	3 52		2.3 72	1.9 91	1.6 108	1.5 124	1.3 139	1.2 153						
490	5.3 29	3 53		2.3 74	1.9 93	1.6 110	1.5 126	1.3 142	1.2 156						
500	5.2 29	3 54		2.3 75	1.9 95	1.6 113	1.5 129	1.3 145	1.2 159						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10											1.1 6	0.9 7	0.8 8	0.7 5	0.6 6
20											1 9	0.9 11	0.8 12	0.7 10	0.6 12
30										1.3 8	1 12	0.9 15	0.8 17	0.7 15	0.6 17
40										1.2 10	1 16	0.9 18	0.8 21	0.7 20	0.6 23
50									1.6 9	1.2 13	1 19	0.9 22	0.8 25	0.7 25	0.6 29
60								1.8 10	1.6 11	1.2 15	1 22	0.9 25	0.8 29	0.7 30	0.6 35
70							2 10	1.7 12	1.6 13	1.2 18	1 25	0.9 29	0.8 33	0.7 35	0.6 41
80							1.9 12	1.7 13	1.6 15	1.2 20	1 28	0.9 33	0.8 37	0.7 40	0.6 47
90						2.2 12	1.9 13	1.7 15	1.6 17	1.2 23	1 31	0.9 36	0.8 41	0.7 45	0.6 52
100						2.2 13	1.9 15	1.7 17	1.6 18	1.2 25	1 34	0.9 40	0.8 45	0.7 50	0.6 58
110						2.2 14	1.9 16	1.7 18	1.6 20	1.2 28	1 37	0.9 44	0.8 50	0.7 55	0.6 64
120						2.2 15	1.9 18	1.7 20	1.6 22	1.2 30	1 40	0.9 47	0.8 54	0.7 60	0.6 70
130					2.6 14	2.2 16	1.9 19	1.7 22	1.6 24	1.2 33	1 43	0.9 51	0.8 58	0.7 65	0.6 76
140					2.6 15	2.2 18	1.9 21	1.7 23	1.6 26	1.2 35	1 47	0.9 55	0.8 62	0.7 70	0.6 82
150					2.6 16	2.2 19	1.9 22	1.7 25	1.6 28	1.2 38	1 50	0.9 58	0.8 66	0.7 75	0.6 87
160					2.5 17	2.2 20	1.9 23	1.7 27	1.6 29	1.2 40	1 53	0.9 62	0.8 70	0.7 80	0.6 93
170					2.5 18	2.2 21	1.9 25	1.7 28	1.6 31	1.2 43	1 56	0.9 65	0.8 74	0.7 85	0.6 99
180					2.5 19	2.1 23	1.9 26	1.7 30	1.6 33	1.2 45	1 59	0.9 69	0.8 78	0.7 90	0.6 105
190					2.5 20	2.1 24	1.9 28	1.7 32	1.6 35	1.2 48	1 62	0.9 73	0.8 83	0.7 95	0.6 111
200				3.2 16	2.5 21	2.1 25	1.9 29	1.7 33	1.6 37	1.2 50	1 65	0.9 76	0.8 87	0.7 100	0.6 117
210				3.2 17	2.5 22	2.1 26	1.9 31	1.7 35	1.6 39	1.2 53	1 68	0.9 80	0.8 91	0.7 105	0.6 122
220				3.2 18	2.5 23	2.1 28	1.9 32	1.7 36	1.6 41	1.2 55	1 71	0.9 84	0.8 95	0.7 111	
230				3.2 19	2.5 24	2.1 29	1.9 34	1.7 38	1.6 42	1.2 58	1 74	0.9 87	0.8 99	0.7 116	
240				3.1 20	2.5 25	2.1 30	1.9 35	1.7 40	1.6 44	1.2 60	1 78	0.9 91	0.8 103	0.7 121	
250				3.1 20	2.5 26	2.1 32	1.9 37	1.7 41	1.6 46	1.2 63	1 81	0.9 94	0.8 107	0.7 126	
260				3.1 21	2.5 27	2.1 33	1.9 38	1.7 43	1.6 48	1.2 65	1 84	0.9 98	0.8 111	0.7 131	
270				3.1 22	2.5 28	2.1 34	1.9 40	1.7 45	1.6 50	1.2 68	1 87	0.9 102	0.8 116	0.7 136	
280				3.1 23	2.5 29	2.1 35	1.9 41	1.7 46	1.6 52	1.2 70	1 90	0.9 105	0.8 120		
290				3.1 24	2.5 30	2.1 37	1.9 42	1.7 48	1.6 53	1.2 73	1 93	0.9 109	0.8 124		
300				3.1 24	2.5 31	2.1 38	1.9 44	1.7 50	1.6 55	1.2 75	1 96	0.9 113	0.8 128		
310				3.1 25	2.5 32	2.1 39	1.9 45	1.7 51	1.6 57	1.2 78	1 99	0.9 116	0.8 132		
320				3.1 26	2.5 33	2.1 40	1.9 47	1.7 53	1.6 59	1.2 80	1 102	0.9 120	0.8 136		
330				3.1 27	2.5 34	2.1 42	1.9 48	1.7 55	1.6 61	1.2 83	1 105	0.9 124	0.8 140		
340				3.1 28	2.5 35	2.1 43	1.9 50	1.7 56	1.6 63	1.2 85	1 109	0.9 127	0.8 145		
350				3.1 28	2.5 36	2.1 44	1.9 51	1.7 58	1.6 64	1.2 88	1 112	0.9 131	0.8 149		
360				3.1 29	2.5 37	2.1 45	1.9 53	1.7 60	1.6 66	1.2 90	1 115	0.9 134	0.8 153		
370				3.1 30	2.5 39	2.1 47	1.9 54	1.7 61	1.6 68	1.2 93	1 118	0.9 138	0.8 157		
380				3.1 31	2.5 40	2.1 48	1.9 56	1.7 63	1.6 70	1.2 95	1 121	0.9 142	0.8 161		
390		4.4 22	3.1 32	2.5 41	2.1 49	1.9 57	1.7 65	1.6 72	1.2 98	1 124	0.9 145				
400		4.4 23	3.1 32	2.5 42	2.1 50	1.9 59	1.7 66	1.6 74	1.2 100	1 127	0.9 149				
410		4.4 23	3.1 33	2.5 43	2.1 52	1.9 60	1.7 68	1.6 75	1.2 103	1 130	0.9 153				
420		4.3 24	3.1 34	2.5 44	2.1 53	1.9 61	1.7 70	1.6 77	1.2 105	1 133	0.9 156				
430		4.3 24	3.1 35	2.5 45	2.1 54	1.9 63	1.7 71	1.6 79	1.2 108	1 137	0.9 160				
440		4.3 25	3.1 36	2.5 46	2.1 55	1.9 64	1.7 73	1.6 81	1.2 111	1 140	0.9 164				
450		4.3 25	3.1 36	2.5 47	2.1 57	1.9 66	1.7 75	1.6 83	1.2 113	1 143	0.9 167				
460		4.3 26	3.1 37	2.5 48	2.1 58	1.9 67	1.7 76	1.6 85	1.2 116	1 146	0.9 171				
470		4.3 26	3.1 38	2.5 49	2.1 59	1.9 69	1.7 78	1.6 87	1.2 118	1 149	0.9 174				
480		4.3 27	3.1 39	2.5 50	2.1 60	1.9 70	1.7 80	1.6 88	1.2 121	1 152	0.9 178				
490		4.3 27	3.1 40	2.5 51	2.1 62	1.9 72	1.7 81	1.6 90	1.2 123	1 155					
500		4.3 28	3.1 40	2.5 52	2.1 63	1.9 73	1.7 83	1.6 92	1.2 126						

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.87

Allowable Soil Stress = 0.07

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10														0.8 4	0.6 6
20													1 6	0.8 8	0.6 11
30											1.2 7	1.1 8	0.9 9	0.8 12	0.6 17
40											1.2 9	1 10	0.9 12	0.8 15	0.6 23
50										1.5 9	1.2 11	1 13	0.9 15	0.8 19	0.6 28
60										1.4 10	1.2 13	1 15	0.9 18	0.8 23	0.6 34
70										1.4 12	1.2 15	1 18	0.9 21	0.8 27	0.6 40
80									1.9 10	1.4 14	1.2 17	1 21	0.9 23	0.8 30	0.6 45
90									1.9 11	1.4 16	1.2 20	1 23	0.9 26	0.8 34	0.6 51
100								2.1 11	1.9 13	1.4 17	1.2 22	1 26	0.9 29	0.8 38	0.6 57
110								2.1 12	1.9 14	1.4 19	1.2 24	1 28	0.9 32	0.8 42	0.6 63
120							2.4 12	2.1 14	1.9 15	1.4 21	1.2 26	1 31	0.9 35	0.8 45	0.6 68
130							2.3 13	2.1 15	1.9 16	1.4 23	1.2 28	1 33	0.9 38	0.8 49	0.6 74
140							2.3 14	2.1 16	1.9 18	1.4 24	1.2 30	1 36	0.9 41	0.8 53	0.6 80
150							2.3 15	2.1 17	1.9 19	1.4 26	1.2 33	1 39	0.9 44	0.8 57	0.6 85
160						2.7 14	2.3 16	2.1 18	1.9 20	1.4 28	1.2 35	1 41	0.9 47	0.8 60	0.6 91
170						2.7 14	2.3 17	2.1 19	1.9 21	1.4 30	1.2 37	1 44	0.9 50	0.8 64	0.6 97
180						2.7 15	2.3 18	2.1 20	1.9 23	1.4 31	1.2 39	1 46	0.9 53	0.8 68	0.6 102
190						2.7 16	2.3 19	2.1 21	1.9 24	1.4 33	1.2 41	1 49	0.9 56	0.8 72	0.6 108
200						2.7 17	2.3 20	2.1 22	1.9 25	1.4 35	1.2 43	1 51	0.9 59	0.8 75	0.6 114
210						2.7 18	2.3 21	2.1 23	1.9 26	1.4 36	1.2 46	1 54	0.9 62	0.8 79	0.6 119
220						2.7 18	2.3 22	2.1 25	1.9 27	1.4 38	1.2 48	1 57	0.9 65	0.8 83	
230						2.7 19	2.3 23	2.1 26	1.9 29	1.4 40	1.2 50	1 59	0.9 68	0.8 87	
240					3.2 17	2.6 20	2.3 23	2 27	1.9 30	1.4 42	1.2 52	1 62	0.9 70	0.8 91	
250					3.2 17	2.6 21	2.3 24	2 28	1.9 31	1.4 43	1.2 54	1 64	0.9 73	0.8 94	
260					3.2 18	2.6 22	2.3 25	2 29	1.9 32	1.4 45	1.2 56	1 67	0.9 76	0.8 98	
270					3.2 19	2.6 23	2.3 26	2 30	1.9 34	1.4 47	1.2 59	1 69	0.9 79	0.8 102	
280					3.2 19	2.6 23	2.3 27	2 31	1.9 35	1.4 49	1.2 61	1 72	0.9 82	0.8 106	
290					3.2 20	2.6 24	2.3 28	2 32	1.9 36	1.4 50	1.2 63	1 74	0.9 85	0.8 109	
300					3.2 21	2.6 25	2.3 29	2 33	1.9 37	1.4 52	1.2 65	1 77	0.9 88	0.8 113	
310					3.2 21	2.6 26	2.3 30	2 35	1.9 39	1.4 54	1.2 67	1 80	0.9 91	0.8 117	
320					3.1 22	2.6 27	2.3 31	2 36	1.9 40	1.4 56	1.2 69	1 82	0.9 94	0.8 121	
330					3.1 22	2.6 27	2.3 32	2 37	1.9 41	1.4 57	1.2 72	1 85	0.9 97	0.8 125	
340					3.1 23	2.6 28	2.3 33	2 38	1.9 42	1.4 59	1.2 74	1 87	0.9 100	0.8 128	
350					3.1 24	2.6 29	2.3 34	2 39	1.9 44	1.4 61	1.2 76	1 90	0.9 103	0.8 132	
360					3.1 25	2.6 30	2.3 35	2 40	1.9 45	1.4 62	1.2 78	1 92	0.9 106	0.8 136	
370					3.1 25	2.6 31	2.3 36	2 41	1.9 46	1.4 64	1.2 80	1 95	0.9 109	0.8 140	
380					3.1 26	2.6 32	2.3 37	2 42	1.9 47	1.4 66	1.2 82	1 98	0.9 112	0.8 143	
390				4 20	3.1 26	2.6 32	2.3 38	2 43	1.9 49	1.4 68	1.2 85	1 100	0.9 115	0.8 147	
400				4 21	3.1 27	2.6 33	2.3 39	2 45	1.9 50	1.4 69	1.2 87	1 103	0.9 117	0.8 151	
410				4 21	3.1 28	2.6 34	2.3 40	2 46	1.9 51	1.4 71	1.2 89	1 105	0.9 120		
420				4 22	3.1 28	2.6 35	2.3 41	2 47	1.9 52	1.4 73	1.2 91	1 108	0.9 123		
430				4 22	3.1 29	2.6 36	2.3 42	2 48	1.9 54	1.4 75	1.2 93	1 110	0.9 126		
440				4 23	3.1 30	2.6 36	2.3 43	2 49	1.9 55	1.4 76	1.2 95	1 113	0.9 129		
450				4 23	3.1 30	2.6 37	2.3 44	2 50	1.9 56	1.4 78	1.2 98	1 116	0.9 132		
460				4 24	3.1 31	2.6 38	2.3 45	2 51	1.9 57	1.4 80	1.2 100	1 118	0.9 135		
470				4 24	3.1 32	2.6 39	2.3 46	2 52	1.9 59	1.4 82	1.2 102	1 121	0.9 138		
480				4 25	3.1 32	2.6 40	2.3 47	2 53	1.9 60	1.4 83	1.2 104	1 123	0.9 141		
490				4 25	3.1 33	2.6 41	2.3 48	2 55	1.9 61	1.4 85	1.2 106	1 126	0.9 144		
500				4 26	3.1 34	2.6 41	2.3 49	2 56	1.9 62	1.4 87	1.2 108	1 128	0.9 147		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.02

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10									1.2 7	1 10	0.8 6	0.7 7	0.7 8	0.6 9	0.5 11
20											0.8 12	0.7 14	0.7 15	0.6 18	0.5 21
30							1.4 9	1.3 10	1.2 11	1 15	0.8 18	0.7 20	0.7 23	0.6 28	0.5 32
40						1.6 11	1.4 12	1.3 13	1.2 15	0.9 19	0.8 24	0.7 27	0.7 31	0.6 37	0.5 42
50					1.8 11	1.6 13	1.4 15	1.3 17	1.2 18	0.9 24	0.8 30	0.7 34	0.7 38	0.6 46	0.5 53
60					1.8 13	1.6 16	1.4 18	1.3 20	1.2 22	0.9 29	0.8 35	0.7 41	0.7 46	0.6 55	0.5 63
70				2.2 13	1.8 16	1.6 18	1.4 21	1.3 23	1.2 26	0.9 34	0.8 41	0.7 48	0.7 54	0.6 64	0.5 74
80				2.2 14	1.8 18	1.6 21	1.4 24	1.3 27	1.2 29	0.9 39	0.8 47	0.7 55	0.7 61	0.6 73	0.5 84
90				2.2 16	1.8 20	1.6 24	1.4 27	1.3 30	1.2 33	0.9 44	0.8 53	0.7 61	0.7 69	0.6 83	0.5 95
100				2.2 18	1.8 22	1.6 26	1.4 30	1.3 34	1.2 37	0.9 49	0.8 59	0.7 68	0.7 77	0.6 92	
110				2.2 20	1.8 24	1.6 29	1.4 33	1.3 37	1.2 41	0.9 54	0.8 65	0.7 75	0.7 84	0.6 101	
120		2.9 16	2.2 21	1.8 27	1.6 32	1.4 36	1.3 40	1.2 44	0.9 58	0.8 71	0.7 82	0.7 92	0.7 102	0.6 110	
130		2.9 17	2.1 23	1.8 29	1.6 34	1.4 39	1.3 44	1.2 48	0.9 63	0.8 77	0.7 89	0.7 100	0.7 107	0.6 118	
140		2.9 18	2.1 25	1.8 31	1.6 37	1.4 42	1.3 47	1.2 52	0.9 68	0.8 83	0.7 95	0.7 107	0.7 115	0.6 123	
150		2.8 19	2.1 27	1.8 33	1.6 39	1.4 45	1.3 50	1.2 55	0.9 73	0.8 89	0.7 102	0.7 115	0.7 123	0.6 130	
160		2.8 21	2.1 28	1.8 36	1.6 42	1.4 48	1.3 54	1.2 59	0.9 78	0.8 94	0.7 109	0.7 123	0.7 130	0.6 138	
170		2.8 22	2.1 30	1.8 38	1.5 45	1.4 51	1.3 57	1.2 63	0.9 83	0.8 100	0.7 116	0.7 129	0.7 136	0.6 143	
180		2.8 23	2.1 32	1.8 40	1.5 47	1.4 54	1.3 60	1.2 66	0.9 88	0.8 106	0.7 123	0.7 136	0.7 143	0.6 150	
190		2.8 24	2.1 34	1.8 42	1.5 50	1.4 57	1.3 64	1.2 70	0.9 93	0.8 112	0.7 129	0.7 143	0.7 150	0.6 158	
200		2.8 26	2.1 36	1.8 44	1.5 52	1.4 60	1.3 67	1.2 74	0.9 97	0.8 118	0.7 136	0.7 150	0.7 157	0.6 165	
210		2.8 27	2.1 37	1.8 47	1.5 55	1.4 63	1.3 70	1.2 77	0.9 102	0.8 124	0.7 143	0.7 157	0.7 164	0.6 172	
220		2.8 28	2.1 39	1.8 49	1.5 58	1.4 66	1.3 74	1.2 81	0.9 107	0.8 130	0.7 150	0.7 164	0.7 171	0.6 179	
230		2.8 30	2.1 41	1.8 51	1.5 60	1.4 69	1.3 77	1.2 85	0.9 112	0.8 136	0.7 157	0.7 171	0.7 178	0.6 186	
240		2.8 31	2.1 43	1.8 53	1.5 63	1.4 72	1.3 80	1.2 88	0.9 117	0.8 142	0.7 164	0.7 178	0.7 185	0.6 193	
250		2.8 32	2.1 44	1.8 55	1.5 66	1.4 75	1.3 84	1.2 92	0.9 122	0.8 148	0.7 171	0.7 185	0.7 192	0.6 200	
260		2.8 33	2.1 46	1.8 58	1.5 68	1.4 78	1.3 87	1.2 96	0.9 127	0.8 153	0.7 178	0.7 192	0.7 200	0.6 208	
270		2.8 35	2.1 48	1.8 60	1.5 71	1.4 81	1.3 91	1.2 99	0.9 131	0.8 159	0.7 185	0.7 200	0.7 208	0.6 216	
280		2.8 36	2.1 50	1.8 62	1.5 73	1.4 84	1.3 94	1.2 103	0.9 136		0.7 192	0.7 208	0.7 216	0.6 224	
290		2.8 37	2.1 51	1.8 64	1.5 76	1.4 87	1.3 97	1.2 107	0.9 141		0.7 200	0.7 216	0.7 224	0.6 232	
300		2.8 38	2.1 53	1.8 67	1.5 79	1.4 90	1.3 101	1.2 110	0.9 146		0.7 208	0.7 224	0.7 232	0.6 240	
310		2.8 40	2.1 55	1.8 69	1.5 81	1.4 93	1.3 104	1.2 114	0.9 151		0.7 216	0.7 232	0.7 240	0.6 248	
320		2.8 41	2.1 57	1.8 71	1.5 84	1.4 96	1.3 107	1.2 118	0.9 156		0.7 224	0.7 240	0.7 248	0.6 256	
330		2.8 42	2.1 59	1.8 73	1.5 87	1.4 99	1.3 111	1.2 122	0.9 161		0.7 232	0.7 248	0.7 256	0.6 264	
340	4.8 24	2.8 43	2.1 60	1.8 75	1.5 89	1.4 102	1.3 114	1.2 125	0.9 166		0.7 240	0.7 256	0.7 264	0.6 272	
350	4.8 25	2.8 45	2.1 62	1.8 78	1.5 92	1.4 105	1.3 117	1.2 129	0.9 170		0.7 248	0.7 264	0.7 272	0.6 280	
360	4.8 25	2.8 46	2.1 64	1.8 80	1.5 94	1.4 108	1.3 121	1.2 133	0.9 175		0.7 256	0.7 272	0.7 280	0.6 288	
370	4.7 26	2.8 47	2.1 66	1.8 82	1.5 97	1.4 111	1.3 124	1.2 136	0.9 180		0.7 264	0.7 280	0.7 288	0.6 296	
380	4.7 27	2.8 49	2.1 67	1.8 84	1.5 100	1.4 114	1.3 127	1.2 140	0.9 185		0.7 272	0.7 288	0.7 296	0.6 304	
390	4.7 28	2.8 50	2.1 69	1.8 87	1.5 102	1.4 117	1.3 131	1.2 144			0.7 280	0.7 296	0.7 304	0.6 312	
400	4.7 28	2.8 51	2.1 71	1.8 89	1.5 105	1.4 120	1.3 134	1.2 147			0.7 288	0.7 304	0.7 312	0.6 320	
410	4.7 29	2.8 52	2.1 73	1.8 91	1.5 108	1.4 123	1.3 137	1.2 151			0.7 296	0.7 312	0.7 320	0.6 328	
420	4.7 30	2.8 54	2.1 75	1.8 93	1.5 110	1.4 126	1.3 141	1.2 155			0.7 304	0.7 320	0.7 328	0.6 336	
430	4.7 30	2.8 55	2.1 76	1.8 95	1.5 113	1.4 129	1.3 144	1.2 158			0.7 312	0.7 328	0.7 336	0.6 344	
440	4.7 31	2.8 56	2.1 78	1.8 98	1.5 115	1.4 132	1.3 148	1.2 162			0.7 320	0.7 336	0.7 344	0.6 352	
450	4.7 32	2.8 58	2.1 80	1.8 100	1.5 118	1.4 135	1.3 151	1.2 166			0.7 328	0.7 344	0.7 352	0.6 360	
460	4.7 32	2.8 59	2.1 82	1.8 102	1.5 121	1.4 138	1.3 154	1.2 169			0.7 336	0.7 352	0.7 360	0.6 368	
470	4.7 33	2.8 60	2.1 83	1.8 104	1.5 123	1.4 141	1.3 158	1.2 173			0.7 344	0.7 360	0.7 368	0.6 376	
480	4.7 34	2.8 61	2.1 85	1.8 107	1.5 126	1.4 144	1.3 161	1.2 177			0.7 352	0.7 368	0.7 376	0.6 384	
490	4.7 34	2.8 63	2.1 87	1.8 109	1.5 129	1.4 147	1.3 164	1.2 180			0.7 360	0.7 376	0.7 384	0.6 392	
500	4.7 35	2.8 64	2.1 89	1.8 111	1.5 131	1.4 150	1.3 168	1.2 184			0.7 368	0.7 384	0.7 392	0.6 400	

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.03

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10										1.1 7	1 8	0.9 5	0.8 5	0.7 6	0.6 7
20										1.1 10	0.9 12	0.8 9	0.8 11	0.6 13	0.6 15
30										1.1 13	0.9 16	0.8 14	0.8 16	0.6 19	0.6 22
40								1.6 9	1.4 10	1.1 16	0.9 20	0.8 19	0.7 21	0.6 25	0.6 29
50							1.7 10	1.5 11	1.4 12	1.1 23	0.9 28	0.8 23	0.7 26	0.6 32	0.6 37
60						1.9 10	1.7 12	1.5 13	1.4 15	1.1 20	0.9 24	0.8 28	0.7 32	0.6 38	0.6 44
70						1.9 12	1.7 14	1.5 15	1.4 17	1.1 23	0.9 28	0.8 33	0.7 37	0.6 45	0.6 51
80					2.3 11	1.9 14	1.7 16	1.5 18	1.4 19	1.1 26	0.9 32	0.8 37	0.7 42	0.6 51	0.6 59
90					2.2 13	1.9 15	1.7 18	1.5 20	1.4 22	1.1 29	0.9 36	0.8 42	0.7 47	0.6 57	0.6 66
100					2.2 14	1.9 17	1.7 19	1.5 22	1.4 24	1.1 33	0.9 40	0.8 46	0.7 53	0.6 64	0.6 73
110					2.2 16	1.9 19	1.7 21	1.5 24	1.4 27	1.1 36	0.9 44	0.8 51	0.7 58	0.6 70	0.6 81
120					2.2 17	1.9 20	1.7 23	1.5 26	1.4 29	1.1 39	0.9 48	0.8 56	0.7 63	0.6 76	0.6 88
130				2.7 15	2.2 18	1.9 22	1.7 25	1.5 28	1.4 31	1.1 42	0.9 52	0.8 60	0.7 68	0.6 83	0.6 95
140				2.7 16	2.2 20	1.9 24	1.7 27	1.5 31	1.4 34	1.1 46	0.9 56	0.8 65	0.7 74	0.6 89	0.6 103
150				2.7 17	2.2 21	1.9 25	1.7 29	1.5 33	1.4 36	1.1 49	0.9 60	0.8 70	0.7 79	0.6 95	0.6 110
160				2.7 18	2.2 23	1.9 27	1.7 31	1.5 35	1.4 39	1.1 52	0.9 64	0.8 74	0.7 84	0.6 102	
170				2.7 19	2.2 24	1.9 29	1.7 33	1.5 37	1.4 41	1.1 55	0.9 68	0.8 79	0.7 89	0.6 108	
180				2.7 20	2.2 25	1.9 30	1.7 35	1.5 39	1.4 44	1.1 59	0.9 72	0.8 84	0.7 95	0.6 114	
190				2.7 21	2.2 27	1.9 32	1.7 37	1.5 42	1.4 46	1.1 62	0.9 76	0.8 88	0.7 100	0.6 121	
200				2.7 22	2.2 28	1.9 34	1.7 39	1.5 44	1.4 48	1.1 65	0.9 80	0.8 93	0.7 105	0.6 127	
210				2.7 23	2.2 30	1.9 35	1.7 41	1.5 46	1.4 51	1.1 68	0.9 84	0.8 98	0.7 110		
220				2.7 24	2.2 31	1.9 37	1.7 43	1.5 48	1.4 53	1.1 72	0.9 88	0.8 102	0.7 116		
230				2.7 25	2.2 32	1.9 39	1.7 45	1.5 50	1.4 56	1.1 75	0.9 92	0.8 107	0.7 121		
240			3.7 19	2.7 27	2.2 34	1.9 40	1.7 47	1.5 52	1.4 58	1.1 78	0.9 96	0.8 111	0.7 126		
250			3.7 20	2.7 28	2.2 35	1.9 42	1.7 49	1.5 55	1.4 60	1.1 81	0.9 100	0.8 116	0.7 131		
260			3.7 20	2.7 29	2.2 37	1.9 44	1.7 51	1.5 57	1.4 63	1.1 85	0.9 104	0.8 121	0.7 137		
270			3.7 21	2.7 30	2.2 38	1.9 45	1.7 52	1.5 59	1.4 65	1.1 88	0.9 108	0.8 125	0.7 142		
280			3.6 22	2.7 31	2.2 39	1.9 47	1.7 54	1.5 61	1.4 68	1.1 91	0.9 112	0.8 130	0.7 147		
290			3.6 23	2.7 32	2.2 41	1.9 49	1.7 56	1.5 63	1.4 70	1.1 94	0.9 116	0.8 135			
300			3.6 23	2.7 33	2.2 42	1.9 50	1.7 58	1.5 66	1.4 73	1.1 98	0.9 120	0.8 139			
310			3.6 24	2.7 34	2.2 44	1.9 52	1.7 60	1.5 68	1.4 75	1.1 101	0.9 124	0.8 144			
320			3.6 25	2.7 35	2.2 45	1.9 54	1.7 62	1.5 70	1.4 77	1.1 104	0.9 128	0.8 149			
330			3.6 26	2.7 36	2.2 46	1.9 56	1.7 64	1.5 72	1.4 80	1.1 107	0.9 132	0.8 153			
340			3.6 26	2.7 38	2.2 48	1.9 57	1.7 66	1.5 74	1.4 82	1.1 111	0.9 136	0.8 158			
350			3.6 27	2.7 39	2.2 49	1.9 59	1.7 68	1.5 77	1.4 85	1.1 114	0.9 140	0.8 163			
360			3.6 28	2.6 40	2.2 51	1.9 61	1.7 70	1.5 79	1.4 87	1.1 117	0.9 144				
370			3.6 29	2.6 41	2.2 52	1.9 62	1.7 72	1.5 81	1.4 89	1.1 120	0.9 148				
380			3.6 29	2.6 42	2.2 53	1.9 64	1.7 74	1.5 83	1.4 92	1.1 124	0.9 151				
390			3.6 30	2.6 43	2.2 55	1.9 66	1.7 76	1.5 85	1.4 94	1.1 127	0.9 155				
400			3.6 31	2.6 44	2.2 56	1.9 67	1.7 78	1.5 87	1.4 97	1.1 130	0.9 159				
410			3.6 32	2.6 45	2.2 58	1.9 69	1.7 80	1.5 90	1.4 99	1.1 133	0.9 163				
420			3.6 32	2.6 46	2.2 59	1.9 71	1.7 82	1.5 92	1.4 102	1.1 137	0.9 167				
430			3.6 33	2.6 47	2.2 60	1.9 72	1.7 84	1.5 94	1.4 104	1.1 140	0.9 171				
440			3.6 34	2.6 49	2.2 62	1.9 74	1.7 85	1.5 96	1.4 106	1.1 143	0.9 175				
450			3.6 35	2.6 50	2.2 63	1.9 76	1.7 87	1.5 98	1.4 109	1.1 146	0.9 179				
460			3.6 36	2.6 51	2.2 65	1.9 77	1.7 89	1.5 101	1.4 111	1.1 150	0.9 183				
470			3.6 36	2.6 52	2.2 66	1.9 79	1.7 91	1.5 103	1.4 114	1.1 153					
480			3.6 37	2.6 53	2.2 67	1.9 81	1.7 93	1.5 105	1.4 116	1.1 156					
490			3.6 38	2.6 54	2.2 69	1.9 82	1.7 95	1.5 107	1.4 118	1.1 160					
500			3.6 39	2.6 55	2.2 70	1.9 84	1.7 97	1.5 109	1.4 121	1.1 163					

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.05

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10														0.8 4	0.6 6
20												1 6	0.9 6	0.8 8	0.6 12
30											1.2 7	1 8	0.9 10	0.8 12	0.6 17
40										1.4 8	1.2 9	1 11	0.9 13	0.8 16	0.6 23
50										1.4 9	1.2 12	1 14	0.9 16	0.8 19	0.6 29
60										1.4 11	1.2 14	1 17	0.9 19	0.8 23	0.6 34
70									1.9 10	1.4 13	1.1 17	1 19	0.9 22	0.8 27	0.6 40
80									1.8 11	1.4 15	1.1 19	1 22	0.9 25	0.8 31	0.6 46
90								2 11	1.8 12	1.4 17	1.1 21	1 25	0.9 29	0.8 35	0.6 52
100								2 12	1.8 14	1.4 19	1.1 24	1 28	0.9 32	0.8 39	0.6 57
110							2.3 12	2 14	1.8 15	1.4 21	1.1 26	1 31	0.9 35	0.8 43	0.6 63
120							2.2 13	2 15	1.8 16	1.4 23	1.1 28	1 33	0.9 38	0.8 47	0.6 69
130							2.2 14	2 16	1.8 18	1.4 25	1.1 31	1 36	0.9 41	0.8 51	0.6 74
140						2.6 13	2.2 15	2 17	1.8 19	1.4 26	1.1 33	1 39	0.9 44	0.8 54	0.6 80
150						2.6 14	2.2 16	2 18	1.8 20	1.4 28	1.1 35	1 42	0.9 48	0.8 58	0.6 86
160						2.6 15	2.2 17	2 20	1.8 22	1.4 30	1.1 38	1 44	0.9 51	0.8 62	0.6 92
170						2.5 16	2.2 18	2 21	1.8 23	1.4 32	1.1 40	1 47	0.9 54	0.8 66	0.6 97
180						2.5 17	2.2 19	2 22	1.8 25	1.4 34	1.1 42	1 50	0.9 57	0.8 70	0.6 103
190						2.5 18	2.2 20	2 23	1.8 26	1.4 36	1.1 45	1 53	0.9 60	0.8 74	0.6 109
200					3 15	2.5 18	2.2 21	2 24	1.8 27	1.4 38	1.1 47	1 56	0.9 63	0.8 78	0.6 115
210					3 16	2.5 19	2.2 23	2 26	1.8 29	1.4 40	1.1 49	1 58	0.9 67	0.8 82	0.6 120
220					3 17	2.5 20	2.2 24	2 27	1.8 30	1.4 42	1.1 52	1 61	0.9 70	0.8 85	
230					3 17	2.5 21	2.2 25	2 28	1.8 31	1.4 43	1.1 54	1 64	0.9 73	0.8 89	
240					3 18	2.5 22	2.2 26	2 29	1.8 33	1.4 45	1.1 57	1 67	0.9 76	0.8 93	
250					3 19	2.5 23	2.2 27	2 30	1.8 34	1.4 47	1.1 59	1 69	0.9 79	0.8 97	
260					3 20	2.5 24	2.2 28	2 32	1.8 35	1.4 49	1.1 61	1 72	0.9 82	0.8 101	
270					3 20	2.5 25	2.2 29	2 33	1.8 37	1.4 51	1.1 64	1 75	0.9 86	0.8 105	
280					3 21	2.5 26	2.2 30	2 34	1.8 38	1.4 53	1.1 66	1 78	0.9 89	0.8 109	
290					3 22	2.5 27	2.2 31	2 35	1.8 39	1.4 55	1.1 68	1 81	0.9 92	0.8 113	
300					3 23	2.5 27	2.2 32	2 37	1.8 41	1.4 57	1.1 71	1 83	0.9 95	0.8 117	
310					3 23	2.5 28	2.2 33	2 38	1.8 42	1.4 58	1.1 73	1 86	0.9 98	0.8 120	
320					3 24	2.5 29	2.2 34	2 39	1.8 44	1.4 60	1.1 75	1 89	0.9 101	0.8 124	
330				3.8 19	3 25	2.5 30	2.2 35	2 40	1.8 45	1.4 62	1.1 78	1 92	0.9 105	0.8 128	
340				3.8 20	3 25	2.5 31	2.2 36	2 41	1.8 46	1.4 64	1.1 80	1 94	0.9 108	0.8 132	
350				3.8 20	3 26	2.5 32	2.2 37	2 43	1.8 48	1.4 66	1.1 82	1 97	0.9 111	0.8 136	
360				3.8 21	3 27	2.5 33	2.2 38	2 44	1.8 49	1.4 68	1.1 85	1 100	0.9 114	0.8 140	
370				3.8 21	3 28	2.5 34	2.2 40	2 45	1.8 50	1.4 70	1.1 87	1 103	0.9 117	0.8 144	
380				3.8 22	3 28	2.5 35	2.2 41	2 46	1.8 52	1.4 72	1.1 89	1 105	0.9 120	0.8 148	
390				3.8 23	3 29	2.5 36	2.2 42	2 47	1.8 53	1.4 74	1.1 92	1 108	0.9 124	0.8 152	
400				3.8 23	3 30	2.5 36	2.2 43	2 49	1.8 54	1.4 75	1.1 94	1 111	0.9 127		
410				3.8 24	3 31	2.5 37	2.2 44	2 50	1.8 56	1.4 77	1.1 97	1 114	0.9 130		
420				3.8 24	3 31	2.5 38	2.2 45	2 51	1.8 57	1.4 79	1.1 99	1 117	0.9 133		
430				3.8 25	3 32	2.5 39	2.2 46	2 52	1.8 58	1.4 81	1.1 101	1 119	0.9 136		
440				3.8 25	3 33	2.5 40	2.2 47	2 54	1.8 60	1.4 83	1.1 104	1 122	0.9 139		
450				3.8 26	3 34	2.5 41	2.2 48	2 55	1.8 61	1.4 85	1.1 106	1 125	0.9 143		
460				3.8 26	3 34	2.5 42	2.2 49	2 56	1.8 63	1.4 87	1.1 108	1 128	0.9 146		
470				3.8 27	3 35	2.5 43	2.2 50	2 57	1.8 64	1.4 89	1.1 111	1 130	0.9 149		
480				3.8 28	3 36	2.5 44	2.2 51	2 58	1.8 65	1.4 91	1.1 113	1 133	0.9 152		
490				3.8 28	3 37	2.5 45	2.2 52	2 60	1.8 67	1.4 92	1.1 115	1 136	0.9 155		
500				3.8 29	3 37	2.5 46	2.2 53	2 61	1.8 68	1.4 94	1.1 118	1 139	0.9 158		

Input Parameters:

Channel Type = Parabolic

Cover factor = 0.9

Allowable Soil Stress = 0.07

C-D Design

Q	S = 0.1% D(ft) T(ft)	S = 0.25% D(ft) T(ft)	S = 0.5% D(ft) T(ft)	S = 0.75% D(ft) T(ft)	S = 1% D(ft) T(ft)	S = 1.25% D(ft) T(ft)	S = 1.5% D(ft) T(ft)	S = 1.75% D(ft) T(ft)	S = 2% D(ft) T(ft)	S = 3% D(ft) T(ft)	S = 4% D(ft) T(ft)	S = 5% D(ft) T(ft)	S = 6% D(ft) T(ft)	S = 8% D(ft) T(ft)	S = 10% D(ft) T(ft)
10															0.6 6
20													1 5	0.8 8	0.6 12
30													1 7	0.8 12	0.6 17
40													1 10	0.8 15	0.6 23
50											1.4 8	1.2 8	1 12	0.8 19	0.6 29
60											1.4 10	1.2 12	1 14	0.8 23	0.6 34
70										1.7 9	1.4 11	1.2 14	1 17	0.8 27	0.6 40
80										1.7 10	1.4 13	1.2 15	1 19	0.8 31	0.6 46
90										1.7 12	1.4 15	1.2 17	1 21	0.8 34	0.6 51
100										1.7 13	1.3 16	1.2 19	1 24	0.8 38	0.6 57
110										1.6 14	1.3 18	1.2 21	1 26	0.8 42	0.6 63
120										1.6 15	1.3 19	1.2 23	1 28	0.8 46	0.6 69
130									2.2 12	1.6 17	1.3 21	1.2 25	1 31	0.8 50	0.6 74
140									2.2 13	1.6 18	1.3 23	1.2 27	1 33	0.8 53	0.6 80
150									2.2 14	1.6 19	1.3 24	1.2 29	1 35	0.8 57	0.6 86
160								2.5 13	2.2 15	1.6 21	1.3 26	1.2 31	1 38	0.8 61	0.6 92
170								2.5 14	2.2 16	1.6 22	1.3 28	1.2 33	1 40	0.8 65	0.6 97
180								2.5 15	2.2 16	1.6 23	1.3 29	1.2 35	1 43	0.8 69	0.6 103
190								2.4 15	2.2 17	1.6 24	1.3 31	1.2 37	1 45	0.8 73	0.6 109
200							2.8 14	2.4 16	2.2 18	1.6 26	1.3 32	1.2 39	1 47	0.8 76	0.6 114
210							2.8 15	2.4 17	2.2 19	1.6 27	1.3 34	1.2 41	1 50	0.8 80	0.6 120
220							2.8 16	2.4 18	2.2 20	1.6 28	1.3 36	1.2 43	1 52	0.8 84	
230							2.8 16	2.4 19	2.2 21	1.6 29	1.3 37	1.2 44	1 54	0.8 88	
240							2.8 17	2.4 19	2.2 22	1.6 31	1.3 39	1.2 46	1 57	0.8 92	
250							2.8 18	2.4 20	2.2 23	1.6 32	1.3 41	1.2 48	1 59	0.8 95	
260							2.8 18	2.4 21	2.2 24	1.6 33	1.3 42	1.2 50	1 62	0.8 99	
270						3.2 16	2.7 19	2.4 22	2.2 24	1.6 35	1.3 44	1.2 52	1 64	0.8 103	
280						3.2 17	2.7 20	2.4 23	2.2 25	1.6 36	1.3 45	1.2 54	1 66	0.8 107	
290						3.2 17	2.7 20	2.4 23	2.2 26	1.6 37	1.3 47	1.2 56	1 69	0.8 111	
300						3.2 18	2.7 21	2.4 24	2.2 27	1.6 38	1.3 49	1.2 58	1 71	0.8 115	
310						3.2 18	2.7 22	2.4 25	2.2 28	1.6 40	1.3 50	1.2 60	1 73	0.8 118	
320						3.2 19	2.7 22	2.4 26	2.2 29	1.6 41	1.3 52	1.2 62	1 76	0.8 122	
330						3.2 20	2.7 23	2.4 26	2.2 30	1.6 42	1.3 53	1.2 64	1 78	0.8 126	
340						3.2 20	2.7 24	2.4 27	2.2 31	1.6 44	1.3 55	1.2 66	1 80	0.8 130	
350						3.2 21	2.7 24	2.4 28	2.2 32	1.6 45	1.3 57	1.2 68	1 83	0.8 134	
360						3.2 21	2.7 25	2.4 29	2.2 33	1.6 46	1.3 58	1.2 70	1 85	0.8 137	
370						3.2 22	2.7 26	2.4 30	2.2 33	1.6 47	1.3 60	1.2 71	1 88	0.8 141	
380						3.2 22	2.7 26	2.4 30	2.2 34	1.6 49	1.3 62	1.2 73	1 90	0.8 145	
390						3.2 23	2.7 27	2.4 31	2.2 35	1.6 50	1.3 63	1.2 75	1 92	0.8 149	
400						3.2 24	2.7 28	2.4 32	2.2 36	1.6 51	1.3 65	1.2 77	1 95	0.8 153	
410					3.9 20	3.2 24	2.7 29	2.4 33	2.2 37	1.6 52	1.3 66	1.2 79	1 97		
420					3.9 20	3.2 25	2.7 29	2.4 34	2.2 38	1.6 54	1.3 68	1.2 81	1 99		
430					3.8 21	3.2 25	2.7 30	2.4 34	2.2 39	1.6 55	1.3 70	1.2 83	1 102		
440					3.8 21	3.2 26	2.7 31	2.4 35	2.2 40	1.6 56	1.3 71	1.2 85	1 104		
450					3.8 22	3.2 26	2.7 31	2.4 36	2.2 41	1.6 58	1.3 73	1.2 87	1 106		
460					3.8 22	3.2 27	2.7 32	2.4 37	2.2 41	1.6 59	1.3 75	1.2 89	1 109		
470					3.8 22	3.2 28	2.7 33	2.4 38	2.2 42	1.6 60	1.3 76	1.2 91	1 111		
480					3.8 23	3.2 28	2.7 33	2.4 38	2.2 43	1.6 61	1.3 78	1.2 93	1 114		
490					3.8 23	3.2 29	2.7 34	2.4 39	2.2 44	1.6 63	1.3 79	1.2 95	1 116		
500					3.8 24	3.2 29	2.7 35	2.4 40	2.2 45	1.6 64	1.3 81	1.2 97	1 118		